THE SCHOOL REVIEW
A JOURNAL OF SECONDARY EDUCATION

VOLUME XXIII MARCH 1915 NUMBER 3

VOCATIONAL TRAINING IN CHICAGO SCHOOLS

JOHN T. McMANIS
Chicago Normal College

Before we accept the argument for a dual board of control for vocational education we should find out what the schools are actually doing that warrants the charge that they are failing to provide practical education. Chicago can show full-fledged vocational schools, industrial and technical courses, and well-equipped organization for the practical training of youth in the regular routine of high and grammar schools. The cosmopolitan high school, one in which cooking and blacksmithing are given in the same building with Greek and art, is not merely a possibility but a working actuality in this city. A brief summary of conditions will convince anyone that within the last half-dozen years Chicago has been rapidly spreading educational advantages to all classes of people. All of this is being done under the management of a single or unit board of education.

In the first place, the administration has perfected an organization to manage work for vocational and industrial education. One district superintendent gives his entire time to the problem of connecting up the schools with industrial needs of the city. Then there are two supervising officers for vocational and technical courses in the high schools, both appointed within the last year or two. In addition to these persons there is a supervisor

of household arts and sciences for the schools and a supervisor of industrial work in the grades.

In the second place, the advocates of the dual system of control have argued that the teachers now in the schools are academic and not practical enough to meet the needs of the industrial education of children. They cite the passing of the old manual-training school, which owed its failure partly to the theoretical and academic teachers who took charge of it. Whether this bit of history be true or not as regards manual-training schools, the present vocational schools of Chicago are safe from that danger because they have practical teachers to handle the work in industries and vocations. The following regulations make clear the practice in the city schools. On October 19, 1910, the superintendent of schools

reports that the work of giving technical instruction in the evening schools to young men and women engaged in the industries has been greatly handicapped for want of teachers who have had a trade experience necessary to equip them for giving the proper kind of instruction. Teachers with good technical-school training, but without experience in the industries, may be had, but such are not competent to do the work required because of the lack of actual trade experience. The right kind of teachers is hard to find, and if the superintendent is given authority to employ such persons when found, their services may be made available at once in the evening schools. The superintendent, therefore, recommends that sec. 118 of the Rules of the Board be suspended, and that authority be granted to the superintendent of schools to issue temporary certificates to graduates of technical schools of good standing who have had the necessary experience in the trades and to employ them as teachers in the evening schools, subject to the approval of the committee and of the Board, such certificates to expire at the end of the school year. The superintendent requests emergency authority to act at once on this matter.

This request was granted.[1] On January 8, 1913,

the superintendent recommends that authority be granted to the superintendent of schools to issue when necessary temporary certificates to men and women with the expert experience that equips them to give practical instruction in their trades, such certificates to expire at the end of the school year; to assign said teachers in the day school, subject to the approval of the Board; and to place said teachers on the regular schedule for technical teachers in the high school if the assignment be a high school, and on the regular

[1] *Proceedings of Board*, 1910–11, p. 242.

schedule for manual-training or household arts teachers in the elementary school, if the assignment be to an elementary school.[1]

At the present time, in the high schools, night schools, and elementary schools, there are many men and women teaching who have had the most complete and successful trade experience in the world of industry. A list of a few of the schools and the courses where teachers of this type are employed will refute the arguments of the advocates of dual control that the schools cannot get "practical" teachers to do the work required and demanded by the business world.

In eight of the high schools of the city there are full four-year courses in technical instruction now in operation. The teachers in these schools are in the majority of cases "practical" men, the others being school men with college training in technical subjects but no trade experience.

Crane Technical High School
- Woodwork..... 3 practical men (from the trades)
- " ..... 5 college-trained men (no trade experience)
- Foundry..... 2 practical men
- Forge..... 2 practical men
- Machine shop... 2 practical men
- Electrical..... 1 practical man
- " ..... 1 with some practical experience

Lane Technical High School
- Woodwork..... 2 practical men
- " ..... 5 college-trained men
- Foundry..... 1 practical man
- Forge..... 2 practical men
- Machine shop... 3 practical men
- Electrical..... 1 practical man
- " 1 college-trained man

Lake Technical High School
- Woodwork..... 2 practical men
- " 1 college-trained man
- Foundry..... 1 practical man
- Forge..... 1 mechanic
- Machine shop... 1 practical man

Bowen High School has all practical men in shop and foundry.

Schurz High School has three practical men and one man without trade experience in its shops.

Senn High School has two practical men and three college mechanics.

Hyde Park High School has all practical men in its shops.

Harrison Technical High School has all practical men in shop and foundry.

[1] *Proceedings of Board*, 1912–13, p. 659.

The above list of eight high schools does not contain all of the men in technical work now employed in the various schools of the city, but it gives an idea of the extent to which men with trade experience have been brought into the work of teaching.

In the commercial courses and the courses for girls there exists the same proportion of teachers with actual commercial and trade experience as shown in the technical courses.[1] Work in accounting and stenography and office preparation is carried on by students under teachers directly from offices and commercial employments. Women with experience as milliners, dressmakers, managers of dining-rooms, and shop workers are in many cases in charge of classes in the Flower Technical School for girls and other high schools of the city.

The night-school classes are taught in a majority of cases by men and women with trade experience. Such courses as sewing, and dressmaking, millinery, bookkeeping, stenography, chemistry, electricity, mechanical drawing, freehand drawing, printing, and agriculture are in the hands of teachers who know their jobs by actual experience.

There is absolutely no excuse, so far as getting practical trade people to teach, for a dual control of our schools. Chicago can show this class of teachers in all of her high schools. Of course the difficulty of getting a man or woman experienced in the industries and at the same time a competent instructor of boys and girls is felt now, but would in no way be lessened by a dual system. It is recognized in the schools now, where such persons have been taken in from the trades, that not all of them will ever become first-class teachers, but the vast majority of them soon learn through association with the regular academic teachers how to do the work. It is this sort of association between the two types of teachers that will make possible the success of the work of each class, and a dual system would therefore defeat the end of good teaching.

[1] Of the 37 teachers of stenography, bookkeeping, commercial law, and commercial geography who entered the day schools during the past year, 26 came direct from the business world; the others had been teachers of commercial subjects in other schools. In the commercial department of the evening schools, 40 teachers with practical experience were added.

If we turn now to the courses offered in the city schools for vocational and industrial training, we are struck by the rapidity with which this work has been taken over into the regular school curriculum and made an organic part of the schools. People who wish to establish vocational schools, *in addition to* the schools already in operation, must be blind to the fact that such schools are already working very efficiently now under the unit management. Notice the various branches now in operation:

1. Industrial centers in 20 elementary schools. (There would have been 46 of this type of school this year if money had been available.) In these schools children in the upper grades—the sixth, seventh, and eighth—are furnished opportunity to enter upon vocational training.

2. Prevocational courses in the technical high schools. Here boys and girls over-age but behind in school work are instructed in vocations.

3. Two-year vocational courses in all of the 22 high schools of the city. These courses are eleven in number as follows: accounting, shorthand, mechanical drawing, designing, carpentry, pattern-making, machine shop, electricity, household arts, printing, horticulture. Two or more of these courses are given in all the schools and most of them could give practically all such courses.

4. Four-year vocational courses as follows: commercial, office preparatory, technical, general trades, household arts, arts, and architecture. In addition to the regular technical high schools, these courses are given in most of the regular high schools where the general, the science, and the normal preparatory courses are given.

5. Apprenticeship courses in several industries: carpenters, electrical workers, plumbers, machinists, sheet-metal workers.

6. Two-year college course for technical education and engineering.

7. Evening-school courses in more than twenty vocational subjects.

A careful study of the following items will show something of the status of vocational education in Chicago:

1. Industrial centers: On May 3, 1911, "the superintendent of schools reports that a division should be made in the elementary

course of study at the beginning of the sixth grade for the purpose of providing an industrial and a general course for pupils, each of which will meet the requirements of graduation and entrance to high school."[1]

Again on January 24, 1912, the superintendent returns to this subject and reports that

> in accordance with this authority, the superintendent, after conference with members of the education department, arranged for two courses of study, and the new division—the industrial course—was printed with the general course of study, and distributed to all of the schools before the opening of September, 1911, so that teachers and principals might be familiar with the tentative plan proposed. As this is the first arrangement of a course of study along these lines, it has been necessary to give consideration to all the details, and up to the present time it has not been possible to determine whether there will be money available during this year for the two extra teachers of industrial and vocational subjects who will be required in each school in which the new division of the course is introduced. As it now appears that enough money will be available to provide these teachers, and as a number of requests have been received from principals of schools like the Jackson and Von Humboldt, situated in congested districts, for the introduction of a course which will keep pupils longer in school and fit them better for their vocations, the superintendent recommends that authority be given to introduce the new course at the beginning of the new semester, and to assign the two additional teachers at each school selected by the superintendent for the introduction of the course.[2]

From letters of principals and teachers in these schools we give the following items:

(1) "In two years since opening center, membership in the eighth grade is 86.9, while for two previous years it was 73.1." (2) "While pupils devote only half as much time to academic subjects as formerly, yet they cover the grade work and the results are creditable." (3) "We have better attendance since opening, and children have less desire to go to work." (4) "Attendance in these grades is larger and more regular than ever before." (5) "Pupils over fourteen remain. Mending in the homes is attended to and cooking and housekeeping are done better. Many pupils go to Flower and Lake Technical schools." (6) "Membership is larger than ever in the sixth, seventh, and eighth grades. The children are happy in their work. The joy of doing things with their own hands gives them encouragement that they, too, are *becoming a vital part* of the great world about them." (7) "Attendance 1913 (before opening), 97.16; in 1914 (first year), 97.72; graduates 1913 were 34,

[1] *Proceedings of Board*, 1910–11, pp. 873–74.

[2] *Proceedings of Board*, 1911–12, pp. 523–24.

in 1914, 47." (8) "This work promotes attendance and pupils will not miss a cooking, sewing, or manual-training class." (9) "An unusual number of girls have gone to work in private families." (10) "Increased attendance—keeps older boys in school." (11) "A decided decrease in the number of work certificates issued to pupils in grades having this work." (12) "Improved attendance." (13) "Fewer boys ask for work certificates and more boys over fourteen in grade than in previous years." (14) "This industrial work has materially affected our attendance. Many more pupils now remain in school until they complete the elementary course. In 1913, before opening this industrial center, 63 pupils were accredited to the high schools. During 1914 we graduated 97 pupils, a gain of 54 per cent in number of pupils completing the grammar grades."

2. Prevocational figures:

Crane	No report	
Flower	Cooking and sewing	76
Harrison	Various lines	35
Lake	No report	
Lane	Woodworking	48
	Forge	60
	Machine shop	24
	Printing	60
	Foundry	20
Total prevocational reported		323

For the two-year vocational, the four-year vocational, the two-year college courses, see the following tabulation of the high-school work of the city. This tabulation (Table I) was compiled from reports of the principals made in January, 1915, and shows the relative numbers taking the courses offered in the high schools. If one remembers that the two-year vocational course was opened in 1910 he may appreciate the rapidity with which it has grown. This growth has not been at the expense of the general course, but indicates an increased number of boys and girls attending high school.

A summary of the commercial work being done in the two-year courses of the high schools of Chicago made in November, 1914, gives the following results:[1]

Business English	studied by	5,352
Stenography	" "	4,195
Bookkeeping	" "	3,045

making a total of ..... 12,592 enrolments in the classes of the high schools in the two-year studies fitting for offices and clerical work in the city.

[1] This summary includes Morgan Park High School.

High School and Subjects	General Course	Normal Preparatory	Science	2-Year Vocational			4-Year Vocational	Technical 2-Year College	Prevocational	Apprentice	Total Attendance	Percentage Vocational and Technical	Percentage 2-Year Vocational
				1912–13	1913–14	1914–15							
Austin	522	175	43										
Accounting				40	50	66							
Stenography				110	130	157							
Carpentry					10	17							
Electricity					15	24					1,215	39	21
Commercial							48						
Technical							153						
Arts							10						
Bowen	609	45											
Accounting						141							
Stenography						140							
Mech. drawing						28							
Machine shop						4							
Household arts						2	1				932	29	23
Architectural							8						
Commercial							5						
Technical							44						
Calumet	169	49	5										
Accounting						24							
Stenography						60							
Mech. drawing						6							
Pattern-making						6							
Electricity						1					356	38	27
Commercial							20						
Office preparatory							1						
Household arts							10						
Architectural							10						
Crane							1,283	136		57	1,476	100	0

Curtis	245	83	8										
Accounting				8	15	67							
Stenography				18	20	96							
Mech. drawing					2	50							
Carpentry						11					595	43	41
Household arts						27	9						
Architectural							2						
Commercial							3						
Englewood	715	242	53										
Accounting						69							
Stenography						178							
Mech. drawing						19							
Carpentry						15							
Electricity						63							
Household arts						1	67						
Design						1					1502	33	23
Commercial							43						
Office preparatory							3						
Technical							16						
General trades							8						
Arts							5						
Architectural							16						
Manual training							1						
Flower		54											
Household art Household science				29	34	52	72				258	100	20
Arts Sewing Cooking						4			76				
Harrison	315	76	2										
Accounting						180			Various lines	Carpenters			
Stenography						150			35	109			
Household art						6	45						
Mech. drawing						50							
Electricity						9					1,177	66	33
Commercial							4						
Architectural							3						
Technical							190						
Arts							3						

High School and Subjects	General Course	Normal Preparatory	Science	2-Year Vocational			4-Year Vocational	Technical 2-Year College	Prevocational	Apprentice	Total Attendance	Percentage Vocational and Technical	Percentage 2-Year Vocational
				1912–13	1913–14	1914–15							
Hyde Park	1,428	98	61	.....	.....	236	251	.....	.....	.....	2,074	23	11
Lake													
Electricity	.....	.....	.....	.....	.....	77	.....	.....	.....	.....			
Commercial	.....	.....	.....	.....	.....	236	.....	.....	.....	.....			
Mech. drawing	.....	.....	.....	.....	.....	12	.....	.....	.....	.....			
Machine shop	.....	.....	.....	.....	.....	12	.....	.....	.....	.....	550	100	61
Technical	.....	.....	.....	.....	.....	.....	210	.....	.....	.....			
Architectural	.....	.....	.....	.....	.....	.....	3	.....	.....	.....			
Lake View	674	55	7										
Accounting	.....	.....	.....	.....	.....	156	.....	.....	.....	.....			
Stenography	.....	.....	.....	.....	.....	194	.....	.....	.....	.....			
Commercial	.....	.....	.....	.....	.....	.....	15	.....	.....	.....			
Office preparatory	.....	.....	.....	.....	.....	.....	6	.....	.....	.....			
Technical	.....	.....	.....	.....	.....	.....	16	.....	.....	.....	1,185	37	29
Household arts	.....	.....	.....	.....	.....	.....	33	.....	.....	.....			
Arts	.....	.....	.....	.....	.....	.....	15	.....	.....	.....			
Architectural	.....	.....	.....	.....	.....	.....	14	.....	.....	.....			
Lane								1912–13 46 1913–14 59 1914–15 74					
Mech. drawing	.....	.....	.....	134	163	170	.....	.....	.....	Carpenters 174			
Carpentry	.....	.....	.....	.....	5	8	.....	.....	.....	.....			
Pattern-making	.....	.....	.....	3	8	18	.....	.....	.....	.....			
Machine shop	.....	.....	.....	30	34	37	.....	.....	24	Gasfitters and Plumbers			
Electricity	.....	.....	.....	217	257	354	.....	.....	.....	127	2,146	100	27
Printing	.....	.....	.....	.....	.....	12	.....	.....	60	.....			
Technical	.....	.....	.....	.....	.....	.....	850	.....	.....	.....			
Gen. trades	.....	.....	.....	.....	.....	.....	46	.....	.....	.....			
Architectural	.....	.....	.....	.....	.....	.....	64	.....	.....	.....			
Wood-working	.....	.....	.....	.....	.....	.....	.....	.....	48	.....			
Forge	.....	.....	.....	.....	.....	.....	.....	.....	60	.....			
Foundry	.....	.....	.....	.....	.....	.....	.....	.....	20	.....			

Marshall	530	134											
Accounting				112	100	94							
Stenography				275	314	313							
Household arts						94	63						
Arts						2	9				1,290	48	38
Commercial							24						
Office preparatory							18						
Manual training							9						
McKinley	790	76											
Bookkeeping				75	81	50							
Stenography				119	126	125					1,045	17	17
Architectural							4						
Medill	570	30											
Stenography				101	181	151							
Bookkeeping				49	58	105					858	30	30
Household art						2							
Morgan Park	222												
Stenography						21					243	9	9
Parker	480	118	17										
Accounting				32	25	25							
Stenography				133	182	185							
Commercial							34						
Office preparatory							3						
Technical							64				980	36	21
Household							24						
Arts							4						
Architectural							26						
Phillips	725	220	47										
Accounting						84							
Stenography						265							
Electricity						43							
Household arts						18	39			Electrical			
Commercial							46			50	1,596	37	25
Technical							10						
Arts							6						
Architectural							8						
Special							35						

High School and Subjects	General Course	Normal Preparatory	Science	2-Year Vocational			4-Year Vocational	Technical 2-Year College	Prevocational	Apprentice	Total Attendance	Percentage Vocational and Technical	Percentage 2-Year Vocational
				1912–13	1913–14	1914–15							
Schurz	987	125	50										
Accounting				123	120	105							
Stenography				271	245	263							
Mech. drawing				17	20	24							
Pattern-making					3	2							
Household arts				63	73	36	60				1,910	38	22
Machine shop						5							
Carpentry				6	4	2							
Commercial							41						
Technical							210						
Senn	1,575	75	20										
Vocational						297	20				1,987 approximately	15	14
Technical													
Tuley	470	93											
Accounting				85	106	145					913	38	38
Stenography				139	158	204							
Waller	465	59	8										
Commercial				281	302	294	4				830	35	35
Totals	11,491	1,807	321			6,091	4,358	210	323	517	25,118	45	24

Apprentice classes are conducted in the schools at the present time and have enrolled in the different lines of work:

Carpenters	236
Plumbers	174
Electrical workers	83
Machinists	24
Sheet-metal workers (until recently)	30
Total in attendance	547

Classes are to be opened at an early date for printers, bakers, and druggists. Most of this work can be carried on and is being carried on with the facilities already at hand with perfect ease and effectiveness. The arguments for a dual system that would double the school plants because there were no opportunities for the industrial workers in the present school organization have no validity so far as the apprenticeship courses are concerned, because they have been accommodated from the first and can continue to utilize the present school plant almost indefinitely.[1]

In the two-year college engineering course the following work is given. This work has been given in two of the high schools of the city and has been successfully carried on. First year: mathematics, science, English, gymnasium are required, while modern language, shop, science, design are elective. Second year: mathematics, science, English, gymnasium are required, and shop, science, engineering, modern language are elective.

A summary of evening-school attendance for November 5, 1914, shows the following work and attendance:

Household courses:

	Women	Total
High-school sewing and dressmaking	987	987
Elementary sewing	680	680
Millinery	276	276
Cooking, high school	177	177
Cooking, elementary	335	335
Total household courses		2,446

[1] An advisory board consisting of a member of the union concerned, a member of the employes' association, and a member of the Board of Education plans the course and conduct of the work.

	Men	Women	Total	
Commercial classes:				
Bookkeeping	767	321	1,085	
Stenography	862	1,323	2,185	
Special business course	213	58	271	
Commercial law	91	7	98	
Total commercial courses				3,639
Industrial subjects:				
Chemistry	188	18	206	
Electricity	744	.....	744	
Woodworking	943	1	984	
Pattern-making	84	.....	84	
Machine shop	305	.....	305	
Foundry	55	.....	55	
Forge	201	.....	201	
Mechanical drawing	1,247	12	1,259	
Freehand drawing	95	22	117	
Printing	123	.....	123	
Agriculture	36	4	40	
Total industrial subjects				4,041
Total household, commercial, and industrial				10,126
Other classes:				
English, for foreigners	8,809	2,650	11,459	
Elementary grade work	2,886	994	3,880	
Regular high-school subjects	1,704	814	2,518	
Physical education	264	413	677	
Classes for deaf	2	9	11	
Total other classes				18,545
Grand total, less 295 counted twice				28,376
Grand total for first quarter last year				21,839

Evening schools have been easily managed by the single or unit system of control and have been extended as rapidly as money was available for them. A dual control would simply add to the expense of the taxpayer by requiring a duplication of building and apparatus for the evening schools where now there is sufficient of both in the regular schools.

It is evident from the growth of vocational and industrial courses in the schools of Chicago that what is needed is more money to foster the work already begun and not an entirely new set of schools.

A TEST OF THE ATTAINMENT OF FIRST-YEAR HIGH-SCHOOL STUDENTS IN ALGEBRA[1]

WALTER S. MONROE
Kansas State Normal School, Emporia, Kansas

The algebra taught in our secondary schools includes two distinct types of subject-matter. One type is made up of the formal processes which consist of manipulations of symbols according to certain rules that have been agreed upon by those who developed the subject. For example, when one solves the equation $6x-x^2+4=2(x-3)(x+2)$, he manipulates the symbols of that equation according to a plan of procedure which has been found satisfactory. First the equation is put in the form, $6x-x^2+4=2x^2-2x-12$. Then it is changed to the form, $3x^2-8x-16=0$. This equation, which is recognized as a quadratic, may now be solved by manipulating the symbols according to one of several plans of procedure. For example, if one forms the product of 4 times 3 times 16 which is 192, adds this to the product of 8 times 8, takes the square root of the sum, 256, which is 16, and finally adds 16 to 8, and subtracts 16 from 8, this sum and difference when divided by 6 are the roots of the above equation.

It is with this type of algebraic subject-matter that we are concerned in this investigation. The formal processes are necessary prerequisites for the solution of practical problems. After the conditions of a problem are expressed in the form of an equation, it is necessary that the symbols of that equation be manipulated so that the values desired can be obtained.

Proficiency in algebra demands that one's knowledge of the formal processes be reduced to the plane of habit and be capable of automatic application. This is just what is demanded in arithmetic. For example, knowledge of the fundamental combinations of the multiplication table must become a matter of habit and the

[1] The writer is indebted to Ernest E. Wellemeyer, Oklahoma City High School, for scoring a large number of the papers and for assistance in giving the tests.

correct product be produced without the higher thought processes being involved. Speed and accuracy, not ability to think or reason out the products, are demanded after the very earliest stages of the child's education. So it is in algebra. The demand so far as concerns the formal side of algebra is for speed and accuracy in performing additions, subtractions, multiplications, and divisions, in removing parentheses, in clearing equations of fractions, in completing squares, etc. It is true that many teachers believe that, when a student is learning the rules for manipulating symbols, the best results are secured when he develops the rules for himself, i.e., when the rules are for him the product of his own thinking. But even those who make this contention agree that a little later the knowledge should be capable of automatic application, at least for those processes which possess fundamental importance. The advantage of reducing the formal processes to the plan of habit is clearly evident when it is realized that the symbols of a given type of example are always to be manipulated in the same way.

The speed and accuracy with which a student performs such formal processes as the multiplication of one factor by another, or transposing terms, or clearing an equation of fractions can easily be measured. And, since these two qualities define the ability to perform those processes which have been reduced to the plane of habit, we may in this way obtain a measure of these algebraic abilities of a student.

It has been the purpose of the writer to devise a set of tests which could be used to measure algebraic abilities and to determine the standards which should be attained in these abilities. In order to select types of examples which are fundamentally important, simple equations with numerical coefficients and numerical denominators were taken, and the tests limited to the distinct types of examples involved in solving such equations. The several types of examples were combined in test F which is reproduced here. The other tests were as follows:

Test A, to multiply $\pm a(\pm bx \pm c)$ where a, b, and c in no case were greater than 9, and in no case were all positive.

Test B, to reduce fractions to a common denominator.

Test C, to solve equations of the type $\pm ax = \pm b$.

ALGEBRA TEST F. SIMPLE EQUATIONS

Name_____ Date_____

Find the value of x in the following equations. Solve the examples on another sheet but be sure to hand in all your work. The solution of an equation should appear in the following form:

$$\frac{-6x-1}{8}-(-4x-8)=\frac{5(3x+4)}{6}$$

$$-18x+3+96x+192=60x+80$$
$$-18x+96x-60x=80-3-192$$
$$18x=-115$$
$$x=-\frac{115}{18}$$

You may leave the value of x in fractional form as above. Do *not* check your work. Work the examples in order as numbered. Do as many as you can in the time allowed, but remember that accuracy counts as well as speed.

1. $-\frac{3x-2}{4}=\frac{x+2}{6}$
2. $-\frac{-5+4x}{3}+2=-4(3x+2)$
3. $3(1-7x)-7-7(-4x+5)=-4(9-4x)$
4. $1-\frac{x+5}{6}=\frac{-4x+9}{8}$
5. $\frac{1-x}{4}-\frac{-3x-4}{8}=\frac{6x+7}{6}$
6. $\frac{4x+5}{15}-\frac{2x+3}{21}=0$
7. $-\frac{3(2x-5)}{5}+\frac{-2(3x+4)}{7}=0$
8. $2-\frac{-5(3+2x)}{6}=5x-4$
9. $7x-5\frac{6x-11}{3}=12$
10. $5+\frac{3x+1}{8}-\frac{-1+2x}{12}=0$
11. $\frac{-4x-3}{6}=8-\frac{4(x-3)}{9}$
12. $4x-9\frac{-4x+7}{8}=3+5\frac{3x-2}{14}$
13. $\frac{2x+3}{10}-\frac{1+2x}{12}+\frac{-4x-5}{15}=1$

Test D, to transpose terms in equations such as $4x-6+5=7x-4-2$.

Test E, to collect terms in expressions such as $-5x+6x-11x+8-3-9$.

In constructing tests B, C, D, and E the examples in each test were made similar to the corresponding step in the solution of the corresponding example in test F. For example, the solution of the first example is as follows:

$$-\frac{3x-2}{4}=\frac{x+2}{6}$$
$$-18x+12=4x+8$$
$$-18x-4x=-12+8$$
$$-22x=-4$$
$$x=4/22$$

The first examples in the other four tests are:

Test B, reduce to a common denominator $-\frac{7x-2}{6}+\frac{x+1}{8}$

Test C, solve $-15x=-4$, answer to be left in the form $x=4/15$.

Test D, transpose the terms containing x to the left-hand side of the equality sign and those not containing x to the right-hand side in $-4x+5=3x-5$.

Test E, collect the terms in $-7x-3x-6+4$.

A mimeographed copy of each test was given to each student. The tests were given by the regular teachers, who were requested to follow printed directions, to twelve classes of first-year students in two city high schools in March, 1914. In both schools, the students who were not doing satisfactory work at the middle of the year were placed in a beginning class. These students were not tested. Owing to a misunderstanding, test B was not given to four classes. The time allotment was as follows:

Test A, 2 minutes	Test D, 2 minutes
Test B, 3 "	Test E, 3 "
Test C, 1 "	Test F, 12 "

The first five were given on one day, and test F on the following day.

In scoring the tests, an example was not counted as attempted unless it had been completed. Thus if a pupil had nearly com-

pleted the tenth example in test F, he was counted as having attempted only 9. However, the method used in computing the averages makes an allowance for this apparent unfairness. After the papers of a class had been scored, they were distributed, first according to the number of examples attempted, and second according to the number of examples right. A statement of the number of pupils who attempted 5 examples, 7 examples, etc., is called the *distribution* of the class according to the number of examples attempted. The total distributions by tests are given in Table I. From these distributions the averages and the average deviations of the group from this average have been computed by the "short" method.

A study of Table I shows that some students worked very rapidly and a few worked very slowly. One student performed 34 multiplications in three minutes while in the same time another pupil performed only 3 multiplications. These are the extreme cases, but the remainder of the group are quite widely distributed. The average number attempted is 17.3, which is almost exactly half of the maximum number. There is a large number of students who worked more rapidly than this average and also many who worked less rapidly. In the other tests the number of examples solved is less and hence the range of distribution is less, but the same general type prevails. The distribution of students according to the number of examples right, with the exception of test A, shows a relatively large number of students who failed to get a single example right.

Similar distributions of students have been shown by other tests, and it is not surprising that a considerable range of variation should exist when specific algebraic abilities are measured. However, the magnitude of the range suggests that those students who work slowly have not been given just the type of training which they need. Certainly the student who can perform only three multiplications, or even ten multiplications, in two minutes needs a type of training essentially different from that demanded by a student who can perform twenty multiplications in the same time. To subject them to the same type of training is probably to give neither the training which he needs.

In Table II the class averages and average deviations are given. One notes immediately a marked difference in averages of the

TABLE I

TOTAL DISTRIBUTIONS

No. Examples	Attempts						Right					
	Test A	B	C	D	E	F	A	B	C	D	E	F
34	1											
33	1											
32							1					
31												
30	1						1					
29	1											
28	1											
27	5						2					
26	4						3					
25	4						3					
24	7						4					
23	13						10					
22	15						8					
21	12						10					
20	8						13					
19	15						9					
18	26		5				17		1			
17	27		2				16		1			
16	29		3				24		3			
15	33		7				26		5			
14	14		12		3		28		8			
13	23		21	5	14	1	21		13	3	2	
12	10		20	26	55	1	12		11	5	7	
11	9		21	37	58	3	8		17	20	12	
10	7		21	45	40	8	13		16	32	32	
9	2	2	35	46	39	19	7		23	35	32	
8	3	2	25	37	25	37	12		17	39	31	3
7	1	13	24	26	16	53	5		15	25	33	4
6	2	40	32	21	12	61	6	1	32	24	31	7
5		57	24	19	9	39	4	5	14	26	23	17
4		60	14	5	3	20	2	10	14	12	22	22
3	1	14	5	3	1	5	4	34	13	9	17	26
2		8	1	3		2	2	36	9	2	8	41
1		1	3	1			2	44	19	11	6	55
0							2	67	44	31	19	74
Total	275	197	275	274	275	249	275	197	275	274	275	249
Av.	17.3	5.4	9.5	9.3	10.4	7.1	15.3	2.0	6.2	7.1	7.0	2.4
A.D.	3.5	1.0	2.9	1.8	1.7	1.0	4.3	1.3	3.9	2.8	2.6	1.6

several classes. In test A, class 8 has an average of 21.5 examples attempted while class 5 has an average of 12.2. Since these classes are from the same school, the difference in ability is due to the

difference in the instruction or in the native ability of the students. Classes 9, 10, 11, and 12 were taught by the same teacher. They show rather marked differences in both averages and deviations. Class 12 has a high average and one of the smallest deviations.

TABLE II

CLASS AVERAGES AND AVERAGE DEVIATIONS

CLASS	EXAMPLES ATTEMPTED											
	Test A		B		C		D		E		F	
	Av.	A.D.	Av.	A.D.	Av.	A.D.	Av.	A.D.	Av.	A.D.	Av.	A.D.
1.....	17.7	3.0	5.2	1.0	11.5	2.6	10.5	1.3	10.3	1.5	7.4	1.3
2.....	18.8	2.7	5.6	0.9	10.0	2.1	10.2	1.4	10.8	1.9	7.7	1.2
3.....	17.5	2.8	5.5	1.1	7.5	2.1	10.4	1.5	11.3	1.3	7.6	1.4
4.....	16.4	3.5	5.0	1.0	8.9	2.3	9.8	1.3	10.9	1.1	7.0	1.0
5.....	12.2	3.4	5.2	0.8	9.9	4.0	8.8	1.7	11.0	1.9	7.3	1.3
6.....	16.7	2.4	5.3	0.9	8.5	2.3	9.6	1.1	10.6	1.7	6.2	1.1
7.....	18.4	3.4	5.2	0.9	8.0	2.0	9.8	1.0	10.2	1.9	6.7	1.0
8.....	21.5	4.4	5.7	1.5	11.0	2.7	10.5	2.0	10.6	2.0	6.1	2.4
9.....	17.4	2.7	.....	.....	9.0	3.4	6.5	1.7	9.4	1.6	6.2	1.7
10....	17.8	4.0	.....	.....	10.1	2.4	7.0	2.3	9.4	2.6	6.8	1.4
11....	19.7	4.6	.....	.....	8.2	2.7	7.7	1.5	9.5	1.5	7.1	1.4
12....	20.6	2.6	.....	.....	10.0	4.0	8.7	1.3	9.8	2.0	6.2	0.8

CLASS	EXAMPLES RIGHT											
	Test A		B		C		D		E		F	
	Av.	A.D.	Av.	A.D.	Av.	A.D.	Av.	A.D.	Av.	A.D.	Av.	A.D.
1.....	15.9	3.8	2.6	1.1	9.2	3.9	9.3	1.8	7.9	2.1	3.3	1.6
2.....	15.5	4.5	2.0	2.0	9.2	3.0	8.1	1.6	6.0	3.1	2.4	1.3
3.....	16.0	3.7	1.2	1.1	5.8	2.9	8.2	2.3	7.5	2.6	2.4	1.7
4.....	14.4	3.8	1.4	1.0	6.6	3.3	7.8	2.1	7.5	2.5	2.1	1.3
5.....	9.2	5.2	1.8	1.1	6.3	4.7	6.2	2.5	6.9	1.1	2.3	1.3
6.....	13.5	3.3	2.2	1.0	6.7	3.1	8.0	2.1	7.6	2.6	2.7	1.5
7.....	15.6	3.8	2.2	1.3	6.6	2.5	8.5	1.3	7.9	2.6	3.6	1.9
8.....	19.3	4.5	1.3	1.0	7.0	4.0	9.8	2.3	6.9	3.3	1.9	1.6
9.....	14.3	3.0	.....	.....	4.2	4.2	2.2	2.5	5.9	1.6	1.9	1.1
10....	14.8	2.8	.....	.....	8.3	2.0	3.9	2.6	6.0	3.0	1.9	1.4
11....	16.8	4.4	.....	.....	4.0	3.6	4.8	2.8	6.3	2.1	2.0	1.4
12....	18.8	4.8	.....	.....	5.8	4.5	7.3	2.2	7.2	1.9	1.9	0.9

The average of class 10 is nearly three examples less than and the average deviation is nearly double that of class 12. This condition indicates the relative efficiency of the teaching in the two classes. Approximately the same method was followed in

both, but evidently it was much more successful in class 12 than in class 10. The members of class 12 exhibit a high degree of ability to multiply and in this there is a high degree of uniformity. In this case the instruction has been well suited to the various members of the class. In the case of class 10, it is evident that the instruction was not so well suited to all members of the class. It was a member of class 10 who made the highest score of examples attempted in the entire group, but 60 per cent of the class made scores less than 17. The method of instruction developed a relatively low degree of ability in these students. It is probable that a different plan of procedure would have given more desirable results.

In tables not reproduced here, it is shown that there is no evidence in support of the frequently expressed belief that girls excel boys in facility in algebra, for in three of the tests the average number attempted by the boys is higher than the corresponding average for the girls, and in the other three tests the conditions are reversed. In every test the boys showed superior accuracy.

The class averages represent the measure of the average ability of the class. For example, the average ability of class 2 in test F is represented by the class average of 7.7 examples attempted. As a tentative standard of this ability we may take the average of the total group, which is 7.1. Comparing the average of class 2 we see that it is 0.6 of an example above the standard; that is, the average of the class in this particular ability is superior to the standard. On the other hand, comparing the average of class 8 with the standard, we find that it is inferior.

The averages and the average derivations from these tests may be used as standards for the purpose of comparing other classes with these, but the writer thinks that they are not satisfactory as permanent standards. This is particularly true when the accuracy of the work is considered. For example, in test F only approximately one example out of three was correct. The percentage of examples right was larger in the other tests, but it must be remembered that multiplication, transposition, etc., are useful only when they are combined as in test F. Hence, we may interpret the results of this test as follows. After six months of instruction the

average first-year high-school student can solve correctly only one out of three simple equations which he attempts when working under the conditions of this test and when the equations possess the difficulty of those in test F.

The correlations of the relative rank of the several classes on the basis of the number of examples attempted except in test B are as shown in Table III.

TABLE III

	Test A	C	D	E	F
Coefficient of correlation with rank in test A	.....	.29	−.21	−.38	−.12
Coefficient of correlation with rank in test C	.29	.....	.18	−.21	−.11
Coefficient of correlation with rank in test D	.21	.18	.....	.64	.30
Coefficient of correlation with rank in test E	−.38	−.21	.64	.....	.61
Coefficient of correlation with rank in test F	−.12	−.11	.30	.61	.....

Perfect correlation would be expressed by a coefficient of 1.00. With two exceptions the coefficients are relatively small. The meaning of this is that each of the tests calls for a different ability.

The number of students who failed to get a single example right is worthy of comment. In test B, 67 students, or 34 per cent, failed to get a single example right. A study of this group shows that the average number of examples attempted was 5.1 and that the average deviation was 1.12. These are almost identical with the average and average deviation for the entire group. This suggests that accuracy is not dependent upon the speed with which a student works. This question was studied in more detail for the entire group.

Table IV shows the distribution of the 250 students who took test F according to the number of examples attempted and the number of examples right. This table is read as follows: Of the eight students attempting 10 examples, one had 8 right, one 7 right, one 6 right, two 5 right, two 1 right, and one none right. From such a distribution it is easy to calculate the total number of examples attempted by those attempting 2 problems, by those attempting

3 problems, etc., and also the total number right by each group. From these two totals the percentage of examples right can be calculated for each group. This percentage is given in the last column of Table IV and expresses the accuracy with which each group worked in test F. For example, those students who attempted 10 examples worked with an average accuracy of 41 per cent, those attempting 9 examples worked with an average accuracy of 34 per cent, etc. A comparison of the percentage of examples right with the number attempted by the group immediately suggests a very close correlation between the two.

TABLE IV

TEST F

Rights / Attempts	8	7	6	5	4	3	2	1	0	Total Examples Attempted	Total Right	Percentage of Examples Right
13	1	.....	.....	.....	.....	.....	.....	.....	.....	13	8	61
12	.....	.....	.....	.....	.....	.....	.....	.....	1	12	0	00
11	.....	1	.....	1	.....	1	.....	.....	.....	33	15	45
10	1	1	1	2	.....	.....	.....	2	1	80	33	41
9	.....	2	1	3	2	2	2	6	1	171	59	34
8	1	.....	1	3	6	5	10	5	7	304	85	28
7	.....	.....	3	5	7	7	4	14	13	371	114	31
6	.....	.....	1	3	6	7	14	12	18	366	96	26
5	.....	.....	.....	.....	1	5	7	12	14	195	45	23
4	.....	.....	.....	.....	.....	.....	3	3	12	72	9	13
3	.....	.....	.....	.....	.....	.....	.....	2	5	21	2	10
2	.....	.....	.....	.....	.....	.....	.....	1	1	4	2	50
Total	3	4	7	17	22	27	41	56	73	.....	.....	.....
Average	10.8	10.3	8.2	8.45	7.6	7.35	6.8	7.0	6.3	.....	.....	.....

In order to be certain that this relation was not due to the accidental combination of several classes, a similar distribution was made for each class and the percentage right was calculated for each group. The result arrived at by this procedure shows that, although the degree of correlation is not always high, the general tendency is for a relatively high degree of accuracy to accompany the more rapid work.

Table V gives the relation between the number of examples attempted and the percentage right for each test except test A. A

study of Table V shows that there is a very high correlation between the number of examples attempted and the accuracy with which these examples were worked, except in test B and test F. The low coefficient of correlation in test F is due almost entirely to two groups of students, those attempting 12 examples and those attempting 2 examples. These two groups involve a total of 3 students out of 250. For this reason the correlation is much closer than is indicated by the computed coefficient. The same conditions exist with respect to test B.

TABLE V

SHOWING RELATION BETWEEN THE NUMBER OF EXAMPLES ATTEMPTED AND THE PERCENTAGE RIGHT

No. Examples Attempted	Total for All Classes				
	Test B	C	D	E	F
18	.....	69	.....	.....	.....
17	.....	85	.....	.....	.....
16	.....	85	.....	.....	.....
15	.....	93	.....	.....	.....
14	.....	71	.....	88	.....
13	.....	75	89	71	61
12	.....	83	85	71	00
11	.....	71	83	70	45
10	.....	80	84	71	41
9	17	72	79	61	34
8	44	57	71	56	28
7	33	73	73	48	31
6	29	63	47	49	26
5	34	55	31	40	23
4	30	57	32	17	13
3	29	11	00	.....	10
2	19	00	17	.....	50
1	00	00	00	.....	.....
Coefficient of correlation	.42	.80	.98	.98	.29

This high degree of correlation means that of these high-school students, the ones who work rapidly work with a relatively higher degree of accuracy than those who work more slowly. This is contrary to the popular belief that those who work slowly work with greater care and accuracy. Evidently students who work rapidly may be just as accurate as those who work slowly. In fact, the data here show that they are superior in accuracy. Thus accuracy must depend upon some factor other than the speed with

which the student works. This being true, it seems reasonable to expect that accuracy can be developed independently of speed, and that its development is not to be secured just by cautioning the student to work more slowly.

Table VI shows a classification of the errors which were made in the several tests. Using the wrong sign is a prolific source of inaccuracy. Even in such simple examples as in test A, the number of errors is quite large. The errors under the head of arithmetic in test C are of the type of writing $x=5/8$ instead of $x=8/5$, as the value of x in $5x=8$. Errors of the last four types involve primarily attention and not knowledge. For example, in test D, when a term is copied $7x$ instead of $5x$, the student has failed to give the requisite degree of attention to the work.

TABLE VI

CLASSIFICATION OF THE ERRORS

	Test A	B	C	D	E	F
Mistakes in sign	436	263	184	295	387	739
Mistakes in the common denominator or in its use	.....	167	.....	.....	.....	371
Mistakes in arithmetic	143	249	498	.....	596	391
Mistakes in copying	.....	.....	.....	382	63	82
One term of binomial not multiplied	29	.....	.....	.....	.....	16
A term neglected	.....	103	.....	302	86	26
x omitted	117	19	.....	53	80	16
Incomplete as $-x=5$	.....	.....	38	.....	.....	26

These facts indicate that the errors made in these tests were due to inattention on the part of the students or to the failure to cause the students to reduce these manipulations of symbols to the plane of habit. Doubtless every student possessed sufficient knowledge, but it failed to function because he was not sufficiently attentive or the knowledge was not capable of automatic application.

If our analysis is correct, improvements may be made in two ways. First, the student is attentive to what appeals to him as worth while, either because of some present interest or because of the realization of future usefulness. Thus the teacher who succeeds in causing his pupils to take an interest in solving equations

will at the same time secure increased accuracy because of the increased attention. This interest will be more permanent if it is based upon the appreciation of the equation as a practical tool.

The other source of improvement is to make automatic each type of manipulation which is required. This requires systematic practice upon each detail. For example, in test C there are four subtypes, $ax=b$, $-ax=b$, $ax=-b$, $-ax=-b$. It is necessary to drill systematically upon each of these subtypes. The drill not only should be systematic but in addition it should be intelligently applied. When the students are drilled upon a type of example, both the individual student and the teacher should know in just what subtypes he is making mistakes. In cases where the student does not soon remedy the defect thus revealed, a detailed diagnosis should be made by the teacher and appropriate remedies prescribed.

This work was undertaken as an attempt to devise a means for measuring a few of the important algebraic abilities and to determine the standard of these abilities for first-year high-school students. A valuable by-product has been the analysis of existing conditions. The averages which are given should be considered only as tentative standards. With this in mind, they will be useful for purposes of comparison.

THE DICTATING MACHINE IN THE SCHOOLS

HOWARD F. TAYLOR
Shortridge High School, Indianapolis, Indiana

The dictating machine[1] is the most improved type of phonograph used for recording and reproducing the spoken word. Its principal use is to enable the business man to dictate to the machine at any time or place or speed, and have it typewritten at a later time without the use of stenography. Its use in business offices has forced our schools to instal the machine in order to give proper training to the pupils of the commercial department.

It also removes a great burden from the typewriting teacher, since one dictation can be used by a number of pupils at different times, and at varying speed. By use of a multiple hearing device, ten, or sometimes thirty, pupils can take the same dictation at the same time, and reproduce it on the typewriter.

Why not increase our efficiency by using this machine in our language department, when the commercial students are not using it? It seems to be of most value in a Latin class, because of the limited vocabulary needed there. The ordinary phonograph, however, has long been used in the teaching of modern languages. The present article rests upon experience in the Latin class alone.

The most important use in the Latin class is in vocabulary, inflections, and grammar. The record prepared by speaking into a tube in an ordinary tone can be heard by the entire class when a large flaring horn is attached by a rubber joint. This same record is afterward repeated to slow or absent pupils, or new pupils, either individually or in groups, with a single, or multiple, hearing device.

By inclosing the machine in a tight box with only the hearing tube protruding, experiments are now being made to enable pupils to study with it in the back of the room while others are reciting in the room.

[1] Otherwise known as the dictaphone.

One cylinder will easily contain all the regular noun and adjective declensions, another the entire synopsis of a verb, with meanings, another a long vocabulary review of a hundred words, another a dozen grammatical rules or examples, frequently repeated. The capacity is eight to twelve minutes of speech. By use of the measuring device any desired part of a cylinder may be used.

In advance study of vocabularies our machine speaks the words repeatedly in groups of two, tells the pupil to write them while it dictates, asks him questions, gives him needed explanations, asks him to say or spell them with or without the machine, and lastly, when several groups have been dictated, gives him a review drill on them. He is encouraged to answer each question before the machine answers it. This method brings almost 100 per cent efficiency in writing six new words given to beginners in eight minutes.

Rules and examples of constructions are repeated again and again by the machine and by the pupils, alternating or uniting with the machine. It takes no longer to teach rules than to hear a recitation upon them assigned for outside study. The association of the rule with a certain tone used by the machine leaves an indelible impression not obtained by the natural voice. The dull pupil and the bright, indifferent boy shine most brilliantly in this work.

The other principal use of the dictating machine is to record the entire explanation of the grammar and forms and spelling of all the words in all the sentences of occasional very important exercises. The pupils who need such help are then required to correct their work outside of the class hour by listening to the machine. How many teachers have fervently wished that, by explaining an exercise once, all the pupils, including the absentees, could have an opportunity to know every step and the reason for it and the spelling of every word! The machine does it.

Other uses add to enjoyment and profit. Any visitor in town after school hours, or in vacation, may leave a speech for the class. A prominent professor, whose elementary book is used by the pupils, prepared a talk in this way for the Shortridge High School Latin pupils, recently. Experts in various lines may give pupils or

teachers direct instruction in their particular fields. They merely have to go to the nearest office where there is a dictating machine, and send the record to the teacher. Latin songs have been recorded by pupils, and outsiders, and taught at any time without the use of a musical instrument.

The mathematics teacher may give a drill in formulas or propositions; the English or history teacher, some essential facts; the elementary teacher, a spelling or arithmetic drill at definite and gradually increasing speeds.

What are the advantages of all this over the teacher's saying the forms with the class?

The first advantage is that the voluntary attention is much better. Second, the teacher may move about the class and see that each pupil is doing exactly what the machine is telling him to do. This is much more effective than when the teacher's mind is busy with speaking. Third, the absent pupil is reached without extra effort and the slow pupil at no expense except his own time. Fourth, the teacher may prepare the record in privacy and may stop to think as often as he wishes, and no delay will appear on the record. Fifth, a reliable pupil may prepare many of the records and thereby relieve the teacher. Sixth, while the teacher is correcting work at the board or at the seats, or marking attendance records, others can be learning with the machine. Seventh, the auditory impression and the visual impression are both obtained at the same time, and the tone of the word is as unchanging on the machine as is the written word on the page. Lastly, it relieves the strain upon the teacher's voice and attention, and indirectly on his nerves, and adds to general efficiency.

The problem of physical and educational measurements, obtained with a machine, presents another phase of its use not within the scope of this article.

VOCATIONAL INFORMATION FOR PUPILS IN A SMALL CITY HIGH SCHOOL

W. A. WHEATLEY
Superintendent of Schools, Middletown, Connecticut

The course in vocational information in the Middletown, Connecticut, High School is divided as follows: the first is a careful consideration of the importance of vocational information, the characteristics of a good vocation, and how to study vocations; the second and main part is a detailed treatment of some eighty or ninety professions, trades, and life-occupations grouped under agriculture, commercial occupations, railroading, civil service, manufacturing, machine and related trades, the engineering professions, the building trades, the learned professions and allied occupations, and miscellaneous and new openings; and the third and concluding part of the course is a practical, thoroughgoing discussion of choosing one's life-work, securing a position, and efficient work and its reward.

Unfortunately, although there are many excellent reference books, bulletins, etc., there seems to be as yet no one suitable book which the pupils can use as a basal text. Here may I be allowed to make a confession? Owing to the difficulties encountered in assigning the lessons, for two years we suspended our work in vocational information, hoping to find a thoroughly satisfactory textbook, or perhaps to wait for the publication of such a one, but, while we know of a manuscript that we think would just fill the bill, we are through with waiting and are making the best use we can of the texts already at hand.

We have found the following books fairly satisfactory as companion texts when supplemented by considerable collateral reading: *Careers for the Coming Men*, by Whitelaw Reid and others; *What Shall Our Boys Do for a Living?* by Charles F. Wingate; and *Starting in Life*, by Nathaniel C. Fowler, Jr. Among the best reference works for the pupils the following are worthy of mention: the vocational booklets published by the Vocation Bureau of

Boston and by the Students' Aid Committee of the High School Teachers' Association of New York City; many free bulletins issued by the federal and various state governments and by the International Correspondence Schools; catalogues, bulletins, and pamphlets of colleges and of trade and professional schools; many trade journals; and a series of ten volumes on *Vocations* edited by William DeWitt Hyde.

In studying each of the vocations we touch upon its healthfulness, remuneration, value to society, and social standing, as well as upon the natural qualifications, general education, and special preparation necessary for success. Naturally, we investigate at first hand as many as possible of the vocations found in our city and vicinity. Each pupil is encouraged to bring from home first-hand and, as far as practicable, "inside" facts concerning his father's occupation. Local professional men, engineers, business men, manufacturers, mechanics, and agriculturists are invited to present informally and quite personally the salient features of their various vocations. And here, since these experts, not being teachers, would otherwise be likely to miss the mark completely and present phases of their work of little interest or value to the pupils, each speaker has explained to him carefully beforehand the purpose of the course in vocations and specifically just what is desired in his particular address.

In order to make this presentation of our course in vocational information just as concrete and understandable as possible, I shall now outline for you two typical lesson plans in two rather separate departments of the vocational field; one is on the poultryman and the other on the mechanical engineer. Also, let me remind you that our work so far has been adapted to the boys only; a little later I shall speak of our recent beginnings for the girls. The esson plans now follow.

A LESSON PLAN ON THE POULTRYMAN

NOTE.—This lesson may be completed in from one to three days, the treatment depending upon the particular locality and the needs and interests of the class.

The setting of the lesson.—Before taking up the poultryman, the class has had a good introduction to general farming and has stressed the importance of agriculture, the nature of this sort of work, present social advantages,

remuneration in money and otherwise, qualifications and education desirable, and starting and succeeding in agriculture. The pupils have also completed, in specialized farming, the stockraiser and the dairyman and, as soon as they have finished this lesson outlined on the poultryman, they will study the market gardener, the fruit-grower, and, more briefly, other miscellaneous agricultural workers, such as the nurseryman, the seedsman, the beekeeper, the veterinary, etc.

Lesson assignments preparatory to the recitation.—All members of the class have been assigned a lesson in their textbook on vocations, or, possibly, in several such books. The class, as individuals or in small groups, has been directed to several farmers' bulletins, issued by the United States and various state governments, to the agricultural yearbooks of the last three or four years, catalogues of agricultural colleges, and if possible to at least one book and one magazine of the following: *Down-to-Date Poultry Knowledge*, by F. W. DeLancey; *Farm Poultry*, by G. C. Watson; *Principles and Practice of Poultry Culture*, by J. H. Robinson; and the monthly periodicals, the *Poultry Fancier* and the *Egg Reporter*.

Two or three members of the class, especially interested in this vocation, have been directed, as special assignments, to interview any local poultry-raisers or dealers in eggs and dressed poultry in order to report to the class such items of interest as the following: how many hens these men raise or sell in a year; how many dollars worth of business they transact; what breeds they find most satisfactory; whether eggs or dressed poultry pay better; whether most of the poultry products consumed in town are raised near by or at a distance; whether the poultry business locally is overdone or offers an attractive opening for young men; how much capital would be necessary to make a fair start, etc.

From their books, bulletins, and periodicals the pupils get vocational facts of a more or less general character, while from the raisers and dealers interviewed they are able to get first-hand, concrete, localized information.

The class exercise or recitation.—The pupils will learn that the eggs produced and the poultry found on the farms by the United States census enumerators in 1910 were worth as much as the wheat crop, or about $620,000,000; that the great egg-producing section of our country is the Mississippi Valley and that this product is not raised by expert poultrymen at all but by general farmers as an incidental or side production; that the scientific poultryman makes his profits by keeping better breeds of hens, whether for egg-laying or meat purposes, in more efficient handling, or care, of fowls to secure greater returns, and in wiser methods of marketing his products. Of course, they also learn something of the nature of poultry-raising and what qualities and education are desired of the prospective poultryman, as well as how one might enter this work and how succeed in it. In this connection, they will investigate and discuss some of the many advantages to be gained from a course in an agricultural college.

The class will discuss such topics as these: the advantages and disadvantages of making poultry-raising a distinct business rather than a branch of general farming; a comparison of eggs and beef in nutritive value and digestibility; the likelihood of poultry products serving as an increasingly important substitute for beef, pork, and mutton; the advisability of selling eggs by the pound rather than by the dozen; how to produce eggs of the best quality and then how to get the best prices for them; how to test and grade eggs; how to discover the particular hens in one's flock that are the best layers; some of the best breeds for egg-producing, for meat, for general purposes; the necessary equipment for poultry-raising, and its cost; the incubator; proper care of laying hens and of poultry for meat purposes; and which is better adapted to a particular locality—poultry-raising, fruit culture, dairying, or general farming.

A LESSON PLAN ON THE MECHANICAL ENGINEER

The place and setting of the lesson.—The treatment of the mechanical engineer in the textbook will be found in the chapter devoted to the engineering professions. Before this particular lesson is taken up the class has already studied a general introduction to the whole field of engineering, touching upon the history, the general division into civil and military engineering, and the inestimable services this group of men has rendered and continues to render mankind in relation to inventions, manufacturing, transportation, communication, conservation, sanitation, etc., instancing such triumphs as the telegraph, the modern printing press, an automobile factory, the Simplon Tunnel, the Brooklyn Bridge, the Panama Canal, reclamation of western land, etc.

Next there was considered in brief outline a general scheme of the work performed by each of the following engineers: the civil engineer, the municipal and sanitary engineer, the mechanical engineer, the electrical engineer, the mining engineer, the metallurgical engineer, the industrial chemist, and the architectural engineer. After completing this general survey of the engineering field, the class treated in detailed fashion the callings of the civil engineer and of the municipal and sanitary engineer. The pupils are now ready to undertake this lesson on the mechanical engineer, which we are about to outline, and they will make a similar detailed study of the remaining five engineers, whose general scheme of work we have already surveyed, and thus they will complete the chapter on the engineering professions.

Lesson assignments preparatory to the recitation.—So much for the setting of the lesson on the mechanical engineer. In preparation for the class exercise or recitation the whole class is asked to review the general scheme of the work of the mechanical engineer and to study the new section in their textbook or books dealing with the nature of this special branch of engineering; its advantages and disadvantages as a life-calling; the remuneration at the start and in a man's prime; the opportunities for regular employment and advancement; and the natural qualifications, the general education, and the special training required.

The entire class, as individuals or in small groups, has been assigned special topics in such free bulletins as *Graduates and Their Occupations*, published by the Massachusetts Institute of Technology; *Suggestions concerning the Choice of a Course in Engineering*, issued by the Carnegie Institute of Technology; *Announcement of the Co-operative Courses of the University of Cincinnati; Mechanical Engineering*, by the International Correspondence Schools; in such catalogues as those of the Massachusetts Institute of Technology, Columbia School of Mines, Cornell University, etc.; in such books as Goddard's *Eminent Engineers*, and McCullough's *Engineering as a Vocation;* and, if possible, in at least two of the periodicals, *Popular Mechanics, Scientific American, Engineering Magazine*, and *Engineering News*.

One or two of the pupils especially interested in this vocation should interview some near-by mechanical engineer in order to report to the class some such items of interest as the following: what work this engineer is engaged in at present; what he considers the greatest piece of mechanical engineering in the neighborhood; how he ranks his branch of engineering with the others; what natural or native qualifications he considers of greatest value to the prospective engineer; what subjects in high school he considers of most importance for his calling; would he advise the regular technological course or the co-operative school and shop course; does he consider mechanical engineering an especially attractive profession, etc.

While studying this branch of engineering, or some other, it would be well to secure a practical, successful engineer to talk to the class informally about any phases of his profession or experiences he has had that would prove of especial interest and value to the study.

The class exercise or recitation.—During the recitation the class might discuss such topics as: which of the three engineers so far studied in detail renders society the greatest service; which one is most necessary to your particular community; which one's work seems perhaps the most attractive; what natural qualifications, what general education, and what special training are absolutely necessary for success in this profession; what subjects should constitute the best high-school course preparatory to this profession; what subjects the best technological schools demand for entrance; what are the advantages and the disadvantages of preparing for this profession in a co-operative school and shop course; what kind of work during summer vacations would serve best in trying out a boy's aptitude for mechanical engineering; what is the difference between an expert machinist and a mechanical engineer; what is a contracting mechanical engineer, etc.

We have just introduced a similar course for girls the second half of this year and are using as texts Lasalle and Wiley's *Vocations for Girls*, Weaver's *Vocations for Girls*, and Perkins' *Vocations for the Trained Woman*, directly supplemented by the

dozen or more pamphlets issued by the Appointment Bureau of the Women's Educational and Industrial Union of Boston, Massachusetts.

When we consider that such a course in vocational information is practicable everywhere, that it is inexpensive, and that besides being intrinsically interesting to the pupils it actually gives them greater respect for all kinds of honorable work, helps them sooner or later to choose more wisely their life-work, convinces them of the absolute necessity for a thorough preparation before entering any vocation and holds to the end of the high-school course many who otherwise would drop out early in the race, should we then apologize when we urge upon educators and the tax-paying public that this branch of vital human knowledge be given a place in all our high schools, especially when it will require only as much time as commercial arithmetic or geography, or one-half as much as algebra, or one-sixth as much as German or French, or finally one-eighth as much as Latin?

Let us not forget that there are already fifty American cities and towns giving their youth some form of systematic vocational guidance. These have done the hard pioneer work; why can we not increase the number to five hundred within a year or two and then make it general within five years? We can easily effect this, if every earnest educator will do his part in his own school system.

SOME FACTS ABOUT THE GENERAL SCIENCE SITUATION

W. L. EIKENBERRY
University High School, University of Chicago

It may be assumed, at the beginning of any discussion upon the subject of general science, that its advocates and its opponents are equally impressed with the importance of science in any educational scheme. Teachers of science owe a distinct debt to Professor Coulter for the incomparable manner in which he has emphasized this importance.[1] His classic addresses should be familiar to every teacher of science and to the administrative officers of our American high schools.

It is in fact this very interest in science instruction and appreciation of its unique mission which make it impossible for many teachers in high schools to view the present situation with complacency. In 1908 the same author stated:

> I may be allowed to say, as the result of many years of experience, that this average college preparation presents to the universities the most narrow and unevenly trained material that can be imagined. Nowhere are the evils of specialization so apparent as in the entrance preparation demanded by many colleges. If this specialization results in comparatively poor college material, its results may be regarded as simply disastrous to the high school in its primary purpose.[2]

This statement, made by a scientific man, may be taken to represent the conditions in the sciences along with other subjects, as the conditions existed at that date. There has been no revolution in the high school since that time sufficient to invalidate the criticism.

The case cannot be allowed to rest with a criticism of science instruction along with that in other branches; it suffers more in

[1] "The Mission of Science in Education: An Address." Published by the University of Michigan, 1900. See also same title, *School Review*, XXIII, 1–8, January, 1915, and *School Science and Mathematics*, XV, 93–100.

[2] "What the University Expects of the Secondary School," *School Review*, XVII, 81, 82.

contrast with them. Data published by the United States Commissioner of Education and referred to by Professor Barber in the preceding number of this journal[1] indicate that the special sciences are in general not holding their own in the high schools, and that they are almost alone in this decrease. Such a condition of affairs in a predominantly scientific age is sufficiently startling. There are possible criticisms of the validity of the statistics which give ground for hoping that the situation is not so bad as it appears, but on the other hand there are confirmatory figures[2] which indicate that the actual situation is far from reassuring. In the state of Connecticut, which may be taken to represent a rather conservative situation, there were in 1910–11 but 6,896 enrolments in science out of a total of 79,172 enrolments in all subjects.[3] In the middle western state of Ohio during a recent five-year period for which data are available, notwithstanding an increase in high-school enrolment of approximately 22 per cent there was a gain of but 5 per cent for the older sciences, as appears in the enrolment figures given in Table I.[4]

TABLE I

	1909	1913	Change
Botany	13,373	14,519	+1,146
Physics	13,094	12,979	− 115
Chemistry	3,980	5,960	+1,980
Physical geography	23,544	23,344	− 300
			+2,711

A partial explanation of the situation, but one wholly devoid of comfort to the advocate of science instruction along established lines, may be found in the growth of agriculture in Ohio. The enrolments in this subject increased from 1,560 in 1909 to 118,333 in 1913. Such extremely unsatisfactory conditions demand both consideration and action on the part of those who are convinced that

[1] *School Review*, XXIII, 11.

[2] See discussion of the data by Downing, "The Scientific Trend in Secondary Schools," *Science*, N.S., XLI, 232–35.

[3] Report of the Board of Education of Connecticut, 1910–11.

[4] Data from Ohio School Report, 1913.

science has a mission in education, if science is to be preserved for the majority of the pupils who are affected by our educational organization.

Essential agreement as to the results which science should accomplish for us in education has not brought agreement as to methods. The methods are conditioned upon many factors. Among these are, not only the final result which it is desired to achieve, but also the nature of the pupil in whom the results must be produced and the character of the institution which is the instrument in the process. These latter two factors have not always been comprehended by those who have discussed science instruction in the high school. It should be kept in mind that the field of secondary education is a special field, which is just as clearly delimited from its co-ordinate fields of elementary and college education and from the correlative departments of advanced instruction which deal with the subject-matter of the sciences as are the sciences from each other.

Failure to understand the secondary-school pupil often results in presentation of a plan of work which is ill adapted to him. The writer has been interested in examining in some detail a high-school textbook which is very largely used in the first year of the high school, written by an author who has not entered publicly into the discussion of the general science movement. It happens that the author has written also a comprehensive college book upon the same subject. One expects to find here a clear recognition of the difference in maturity and mentality between a ninth-grade pupil and a college student. Comparison of the two books reveals that every chapter in the college book, save one, is present in the high-school book either as a chapter or as a subdivision of a chapter, and headings are almost identical. In two chapters which were selected at random for more detailed examination it was found that every section but two in the college book reappeared in the high-school book, usually under identical caption and in the same order, but occasionally as paragraphs added to the nearest related section. Even the diction is similar, and in many cases whole sentences are identical. It is not often that such direct comparison can be made, but all high-school teachers will recognize

that many textbooks and many educational articles carry the point of view of the mature mind as clearly as does this book. These are usually good books, and would serve admirably for the instruction of a pupil with the type of mind for which the authors wrote the books. Unfortunately the type does not exist in at least the earlier years of the high school. Similar misapprehension of the pupil colors much of the current educational literature.

No less confusing are the results of failure on the part of writers to command the facts about the high school as an institution. It must not be forgotten that the present high school is a unique institution and one of very late growth. The high school of today is a very different thing from that of a decade ago and bears only a remote resemblance to the school of the eighties. Many of the arguments directed against general science would not be presented if the obvious scientific procedure of first securing the facts about the high school were employed.

The question of teachers for general science courses will serve as well as any for illustration, since some of the elements of the problem are readily reduced to quantitative statement. It is asserted in many quarters that it is wholly impossible to secure teachers for a subject so broad as general science. The contrast is made with special sciences, each taught by an instructor who is a specialist in his subject and who devotes his whole time and energy to it. Many students of education would feel that there is at least room for argument as to whether a teacher with the narrow range of interest and training indicated is likely to be the best instructor of youth. Granting that he is, a very attractive picture of ideal conditions can be drawn. The difficulty is that the high school whose practical administration allows of an organization of specialists is an extremely rare phenomenon. The writer pointed out in the pages of this *Journal*[1] that in 1912 approximately 89 per cent of the teachers of first-year science in Illinois were instructing in at least three subjects, while as many as 40 per cent had no fewer than five subjects. More complete data have been available at any time.

In the current issue of the *Illinois School Directory*,[2] issued from the office of the superintendent of public instruction, are

[1] "First-Year Science in Illinois High Schools," *School Review*, XXI, 546.

[2] *Illinois School Directory*, 1914–15, Circular 81, Springfield, 1914.

listed 507 operating township and city four-year high schools. The reports from 63 of these are incomplete and could not be used in the summaries given below, but only one of the missing schools is of sufficient size to be of importance. Where the report is complete, the *Directory* gives for each high school the name of each teacher with the subjects taught. The accompanying tabulation (Tables II, III, IV) exhibits the distribution of science teachers among the various subjects. Supervision is counted as an additional subject in the case of the few administrative officers who are listed as teaching a single subject. Biology is counted as two subjects since it undoubtedly usually represents separate courses in botany and zoölogy. In either of these cases the number of teachers involved is too small greatly to influence the totals.

TABLE II

DISTRIBUTION OF TEACHERS AMONG COMBINATIONS OF SCIENCE AND NON-SCIENCE SUBJECTS TAUGHT*

NUMBER OF SCIENCES	NUMBER OF NON-SCIENCE SUBJECTS						TOTAL
	0	1	2	3	4	5 or More	
1 Science	116	101	56	23	10	2	308
2 Sciences	35	39	20	10	4	.....	108
3 Sciences	5	7	3	4	1	.....	20
4 Sciences	3	3	1	1	.....	.....	8
Science	123	178	60	7	8	1	377
Biology	36	.....	.....	.....	.....	.....	36
Total teachers							857

*Figures in table indicate number of teachers in the group teaching the number of sciences indicated at the left-hand end of the line in combination with the number of non-science subjects indicated at the top of the column.

TABLE III

DISTRIBUTION OF 116 SPECIAL TEACHERS OF ONE SCIENCE ONLY

Physics	31
Chemistry	23
Geography	27
Botany	5
Zoölogy	9
Physiology	14
Agriculture	4
Total teachers	116

TABLE IV

SUMMARY OF DISTRIBUTION OF TEACHERS BY SUBJECTS

High schools represented	444
Total number of teachers represented	857
Total instructing in two or more subjects	741
Total instructing in one subject only	116
Percentage instructing in one subject only	13.53
Total science teachers in city of Chicago	134
Total instructing in two or more subjects	63
Total instructing in one subject only	71
Percentage instructing in one subject only	52.98
Total science teachers outside of Chicago	723
Total instructing in two or more subjects	561
Total instructing in one subject only	45
Percentage instructing in one subject only	6.22

The data presented in Tables II–IV show that in the state of Illinois only 13.53 per cent of the teachers of science are able to restrict themselves to a single subject. If we eliminate the city of Chicago from consideration, the proportion falls to the strikingly small proportion of 6.22 per cent. This latter figure doubtless more nearly represents conditions in all those states in which a large city is not a part of the situation. Even if we include in the calculation the biology teachers and all other cases in which the instructor is assigned two sciences only, the percentage for the whole state is increased only to 21.8 and for the portion outside of Chicago, to 13.1. There are but six schools in the state in which all the science teachers are able to restrict themselves to a single subject. The vision of schools with faculties made up of specialists may well be laid away along with other notions which lie outside the region of practical affairs.

The condition discussed above is not the result of poor administration, nor is it peculiar to this state. The tabulation of the schools of Illinois according to size (Table V) shows that there are few large schools.

Administrative officers agree that it is not possible to secure a well-differentiated departmental organization with a school of fewer than 500 pupils; ordinarily it is not accomplished in a school

of fewer than 1,000 pupils. As a matter of fact, there are in Illinois no schools of fewer than 600 pupils which have as many as five science teachers. Accepting 500 as the line of division, there are in the state 36 schools in which teaching by specialists is possible if the curriculum includes only a limited number of sciences, and 13 schools in which it is probable. The total number of teachers involved is 181 in the former case and 114 in the latter.

TABLE V

SUMMARY OF 444 HIGH SCHOOLS OF ILLINOIS BY SIZE

Size not given	6
Less than 100 pupils	259
100–199	94
200–299	26
300–399	18
400–499	5
500–999	23
1,000 or more	13
Total	444

This abundance of small schools is not a condition peculiar to Illinois; rather it appears to be characteristic of the high-school situation generally. No data are available covering all the high schools of the country in detail, but certain studies of representative groups have been made. Jessup and Coffman have reported upon the schools of the North Central Association of Colleges and Secondary Schools.[1] The 667 schools in this association are distributed through eleven states. They have been admitted to the organization on the basis of efficiency and may therefore be taken to average somewhat above the mean for the North Central states. The following data are taken from the tabulations and summaries:

Median school enrolment by states, 112 to 244 pupils.

Median enrolment by cities, above 500 only in cities with population above 50,000.

Total number of schools with enrolment below 500 is 571.

Total number of schools with more than 20 teachers, 99.

Median number of teachers, by states 5–10.

It will be noted that the small size of schools and the small number of teachers are characteristic of this rather broadly

[1] "North Central High Schools," *Thirteenth Yearbook of the National Society for the Study of Education*, 1914, Part I, pp. 73–115.

distributed group of selected schools just as they are of the unselected group studied in the state of Illinois.

Jessup has also shown for the state of Iowa,[1] on the basis of a study of 200 schools, that but 19 per cent of all teachers are instructing in one subject only. In the sciences the largest proportion of special teachers is found in the subject of physics where one teacher in a hundred is teaching physics alone.

It is obvious that it is not possible to gain from the rather extended data available the notion that the high school affords opportunity to any considerable number of special teachers. It would appear, therefore, that those who base their recommendations upon an organization with highly specialized teachers have not been in possession of certain essential facts which are evident to those who are familiar with the high schools.

That there is a problem relative to securing teachers for general science, just as there is a problem with reference to all science teachers, is recognized. It may be noted from the foregoing tables that very much the largest number of teachers are engaged in teaching science without limitation as to department and frequently with other subjects added. The major technical qualifications for which administrative officers must look, therefore, are knowledge of the subject-matter of science in general and ability to teach, and these are important qualifications for the general science teacher as well. The problem arises from the fact that the only institution which is in position to supply the needed teachers has not faced the facts. In spite of the fact that the high schools are equipped almost exclusively with college-trained teachers and that the colleges encourage their graduates to seek such positions, most college instructors in science appear to cherish the delusion that they are training special teachers. When the colleges come to insist upon greater breadth on the part of prospective teachers and require professional preparation as a prerequisite to their own recommendation to teaching positions, much progress will have been made with the problem of preparation of science teachers.

Another important fact regarding the high school as an institution is that the science curriculum has never been reduced to

[1] "Specialization in High School Teaching," *Midland Schools*, XXVIII, 169–71.

coherence. Investigations by Hunter, Weckel, and Caldwell, lately reviewed and extended by Downing,[1] have shown that the usual sciences may occur in almost any conceivable sequence. If data were included representing the remainder of the sixteen or more sciences and quasi-sciences now represented in the high schools, confusion would be worse confounded. Professor Barber, in his paper in the January number of the *School Review* (p. 20), pointed out that the same uncertainty rules in the arrangement of subject-matter within the sciences. Certain general tendencies may be discerned, but nothing more definite. General science is not an interloper, disturbing a satisfactory and established order of things. Rather, it has been shown that enrolment in science is commonly greater in three years following general science than in four years without it.

General science is the first step in an attempt to secure some sort of order and sequence worthy that discipline which has been supposed to be the synonym of organization. It attacks the problem at the logical point of beginning, the first year, and by the only method that ought to appeal to scientific men—experiment. General science is frankly experimental, but it is not a random or uncontrolled experiment. It has been designed by those who are in the schoolroom and know the situation, and the final decision will be made upon the evidence presented by the high-school teachers of the country and on the basis of classroom results. It is therefore wholly independent of the a priori judgments of those who are not in contact with first-year pupils or have not come into relation with the experiment in the classroom. This experiment, like any other scientific investigation, requires first-hand contact with materials. At the present moment, general science lays claim to the consideration of educators as the only constructive proposal for the reform of the secondary science curriculum, resting upon an experimental basis.

The ideal of general science has not been better expressed than in the words of the author who was quoted in an earlier part of this paper.

[1] "Some Data regarding the Teaching of Zoölogy in Secondary Schools," *School Science and Mathematics*, XV, 36–43, January, 1915.

A minimum of subjects and a maximum of time, continuous rather than scattered work, a range broad enough to touch upon all of the fundamental regions of work, methods that will secure precision in thought and expression, contact with the life and work of the times in which we are destined to live, are certainly principles that are sufficient, but concerning whose details none should dogmatize, for they may well vary with the teachers and with the local conditions.[1]

General science proposes to be continuous and coherent throughout the year instead of dividing the time between two or more sciences; it is continuous with the later sciences and affords a bond of union between them; it is continuous with the experiences of life. It is broad enough to touch all fields of science and to allow the use of the scientific method as it is expressed in life. It is in relation with the life that the pupils are now leading and with that which they are about to enter as they leave school.

General science takes the pupil as it finds him in reality, usually with little acquaintance with science and scientific habits of thought, and attempts to turn him over at the end of the year with something of both. Because the first-year pupil is neither capable of extensive abstraction nor interested in the philosophical generalizations of science, the course deals with materials which have not been abstracted from the relations in which the pupil knows them, and it proceeds by analysis of the phenomena toward final abstraction and generalization. A general science course is not synthetic in the sense of composing a whole from its elements; rather it is analytical since it deals with an environment which is already composed and attempts to resolve at least some of its elements. Perhaps the course might better be called integral.

Since facts are the groundwork of science, any science study must be informational, and a very large amount of information is defensible in a first-year course. At this time the pupil is yet in the stage where a large part of his attention is absorbed in getting acquainted with his immediate environment. So long as the facts are related to the real world in which he lives rather than to a philosophical abstraction, they and the principles developed in connection with them become a part of the mental furniture of the

[1] Coulter, "What the University Expects of the Secondary Schools," *School Review*, XVII, 82.

individual, ready to be applied to the solution of problems arising out of new situations. Dissociate the facts from their real setting and they are only so much information which is less than encyclopedic because it is not alphabetized and available. The writer is sure that he appeals to the experience of many others than himself when he selects as an example the common high-school courses in plant morphology and evolution. The principles involved are too abstruse for the ninth-grade child and the facts are remote from any concrete connections. The weaker students and the more independent ones give it up as hopeless; the more faithful and docile ones learn the material by rote. It would be difficult to imagine a more barren example of encyclopedic information without even the saving grace of remote usefulness. The encyclopedic will be found in any course which carries too much the point of view of the mature mind, whether called special science or general science, for the framework of principles which binds such a course together is beyond the grasp of the adolescent child. Failing the principles, there is nothing for the pupil to get but unrelated facts.

Those who are engaged in teaching courses in general science and in developing such courses to fit the needs of their pupils are not trying to provide the pupils with unattached information; but they believe that from the phenomena of nature there may be chosen a group of phenomena that are closer to the actualities of adolescent life than those commonly used, while at the same time these materials may be equally educative. They believe that these materials can be organized in a manner that will relate them on one side to the mental processes of the pupils as they come to the high school and on the other to the more special and philosophical organization of later instruction and to life outside of school. The present types of organization in general science, as in special science, are not perfect. It is expected that investigation and experience will modify this organization as they are doing with all the subjects in the curriculum. To this end general science invites keen and frank criticism from all those who are in contact with the experiment at any of the hundreds of places where it is in progress.

EDUCATIONAL NEWS AND EDITORIAL COMMENT

The North Central Association

The annual meeting of the North Central Association will be held at the Hotel LaSalle, Chicago, during the week of March 15. Public meetings will be held on March 19 and 20. The meeting of the Commission on Accredited Schools and Colleges will be held on the 18th, and the deliberations of the Board of Inspectors will occur during the other days of the week.

New Journals

A new journal entitled *Educational Administration and Supervision* appeared on January 1 under the editorship of Professors Coffman and Johnston, Commissioner Snedden, and Superintendent Van Sickle.

The first number of the new journal contains articles on the larger unit of school administration, on the character and functions of the school superintendent, on high-school matters, and on college matters relating to the supervision of students. Discussions and editorials extend the range of topics treated to include city charters for schools, the Harvard-Newton composition scale, vocational tendencies in education, school surveys and supervision, with comments on the relation between high schools and universities and the relation of the federal government to public education.

These titles make it evident that the new journal intends to deal with all sorts of administrative problems in the universities and intermediate schools down to the lowest grade of the elementary school. The influence of such a journal ought to be very wholesome in enlarging the scope of interest of superintendents and school administrators. Heretofore the problems of the high school and the college have commonly been in the hands of officers who have not concerned themselves very largely with the problems of elementary education. If all of these interests can be drawn together, many of the problems which arise because of the separation of the different units of the school system will tend to disappear.

One cannot welcome too heartily this new member of the fraternity of serious journals. At the same time the question arises, as it has often arisen before, whether it would not be better for all of the better journals to get together in some combination which would make it more easily

possible for school officers and students of education to get hold of periodical literature somewhat more readily. There is danger of dissipating interests in the competitions that arise between journals, especially when one faces the fact that in spite of the improvement in educational journalism there is still a very large body of periodical material which is of a low grade. The ordinary teacher is importuned to buy the local state journal and very frequently gets a narrow view of education because his reading is limited to one or two such journals. The serious journals are highly specialized and not united in promoting the general interests which each tries to serve in its special field. The result is that anyone who wants to get at the best current literature in education has to deal with a number of relatively inaccessible periodicals. The time will doubtless come in the not remote future when the type of combination which will make all of these journals accessible to the ordinary reader will in some fashion be worked out either through the publication of all of these journals by some great association or by a voluntary combination of the journals themselves.

C. H. J.

School and Society also made its first appearance in January. It is edited by Professor J. McKeen Cattell, of Columbia, editor of *Science*, the *Popular Science Monthly*, and the *American Naturalist*. A unique feature of *School and Society* is the fact that it is a weekly. Announcements indicate that it "will cover the whole field of education in relation to the problems of American democracy." This wide scope gives promise of fulfilment in the January issue, which is fresh, vigorous, and comprehensive. In general appearance this periodical is far superior to any other educational journal. There is perhaps a suggestion of "the-world's-greatest-newspaper" type of advertising in the statement "Aiming to become the professional journal for those engaged in the work of our lower and higher schools."

Home Study

The *School Review* is fortunate in being able to promise its readers in the near future a complete report of an extended investigation of home study. Professor W. H. Heck, of the University of Virginia, is at present concluding the investigation. Up to this time he has examined eleven grammar schools (Grades V–VIII) and seven high schools. Of 1,785 grade pupils questioned 3 per cent study at home before going to school in the morning, 21 per cent in the afternoon of school days, and 73 per

cent in the evening of the entire week. Three per cent study on Sunday. Approximately the same percentages obtain for the 1,072 high-school pupils questioned. About half of the grade pupils study in a quiet room, as do 80 per cent of the high-school pupils. In answer to the question, Would you rather have your present school day longer with more time for study at school, or shorter with less time for study at school, or about the same as it is now? the vote is as follows:

Grade pupils:	Longer, 156;	Shorter, 518;	Same, 1,064
High school:	" 131;	" 309;	" 618

The most significant question is this: Can you prepare your lessons better at school or at home?

Grade pupils:	School, 555;	Home, 1,176
High school:	" 250;	" 760

Allowing for the large percentage of expected error in questionnaires, especially when they are addressed to children, one finds that the generalizations based on this and similar data have an important bearing, both for the advocates of a longer school day, and for the advocates of home study.

Eight Bills before Congress

Of the eight bills concerning education now before Congress, the following are of most importance:

The Smith-Hughes bill proposes to appropriate $3,000,000 a year to promote industrial education. A federal board, with the Commissioner of Education as executive officer, is to co-operate with similar state boards, for paying the salaries of teachers of trade and industrial subjects; also for preparing teachers and supervisors of these subjects. To receive any appropriation a state or local community must contribute one dollar for every dollar received from the federal funds. The state or local community must also provide plant and equipment.

The Lewis bill proposes to create a national university at Washington and to appropriate $500,000 for the first year.

The French bill proposes to subsidize the training of forestry students in collegiate institutions of states in which there are federal forest reserves.

The Abercrombie bill provides $15,000 the first year and $22,800 each succeeding year until 1920, and $17,500 yearly thereafter until 1925, for investigation of plans to eliminate adult illiteracy in the United States.

The Hughes bill proposes to create a federal motion-picture commission as a division of the Bureau of Education, this body to license films used in interstate commerce and to withdraw licenses for cause.

Three bills of lesser importance are (1) to print at cost elementary textbooks for the states through the national public printer; (2) to establish a board of university regents for the District of Columbia; (3) and to create in the Department of Labor a bureau for the deaf and dumb.

The Harvard-Newton Bulletins

The first two bulletins of the "Harvard-Newton Series" have just been issued by the press of Harvard University. In this series will be published the results of experiments and investigations carried on in the Department of Educational Research of the Newton schools; in these the Newton school system under Dr. Spaulding and the Harvard department of education under Professor Hanus co-operate. ***Bulletin I*** sets forth the plan and outlines the program of work. The following topics are to be studied:

1. Differentiation in the treatment of pupils on the basis of the capacity they show for independent work. History; geography; arithmetic.

2. The most advantageous disposition of a study period. (Subperiods at intervals, especially with intervening night, *v.* unbroken periods.)

3. The most advantageous disposition of review in a given material.

4. Comparative tests of various methods for speed in teaching special topics; e.g., long division; English grammar in high school.

5. How can a school assist in encouraging and refining the avocations of its pupils?

6. The development of a typical, uniform character-analysis based on the relations incident to school life. Hence, also the analysis of all phases of school life with a view to the opportunities they may afford for the display of definite characteristics in the pupil.

7. The development of a method for the scientific study of individual problem-cases, whether of instructional, disciplinary, or other nature.

8. The closer articulation of high school and grammar school: (*a*) in general organization; (*b*) in English; (*c*) in science; (*d*) in history.

9. The analysis into fundamental abilities of aggregates now usually rated as units; e.g., English, mathematics, etc.; also the invention of

tests and scales for the objective measurement of these abilities: Hillegas scale; eighth-grade scale.

10. The division of labor in teaching: the organization of class work to permit the larger use of conspicuous abilities in the teacher.

11. Effect of regulation of periods on quantity and quality of work.

12. A psychological analysis of successful teachers.

Bulletin II is entitled "Scales for the Measurement of English Compositions"; it is by Frank Washington Ballou, Ph.D. It forms by far the most efficient study of this important subject ever made.

This series promises to be of very great value for every principal, superintendent, and all other students of the science of education.

Economy of Time

President Lowell's annual report gives vigorous expression to the chief argument for economy of time in education. Already the experiment of lopping off the eighth grade, an experiment now two years old in the University of Chicago High School, is amply justifying itself. The pupils present a somewhat startling appearance when they enter the high school, they seem so young. Nevertheless they do not lag behind their classmates, who have spent on the average one whole year more in the endless repetition of the grades.

One whole year of life saved! Multiply it by the millions of lives affected, and the total becomes enormous. But the mere economy of time is relatively unimportant, compared with the economy of learning power for those children destined for college and graduate work. For general education President Lowell believes that "maturity may easily become over-ripe"; that the college student should enter at seventeen and begin his professional studies at twenty-one. "All this because it is during these early years that intellectual growth is most rapid" and "youths make the greatest profit by their books." According to Mr. Lowell, the average age (eighteen and one-half) of Harvard Freshmen represents at least a year of educational waste.

Critics of the proposed changes fear that educational advantages may be lessened for the multitudes. To this fear the reply is that the multitudes drop out before the eighth year of the elementary school; that in larger school systems eight years of proper work retained for those who do not mean to enter the high school put a premium of pride upon *omitting* the eighth grade, and may result in less mortality at the completion of elementary work. Finally, the eighth year, if it is largely

waste, ought, under any logic, to be omitted. To maintain educational plants merely to keep children in school is a shameful error—unless the school time be profitable.

ARTICULATING ELEMENTARY SCHOOL, HIGH SCHOOL, AND COLLEGE

Educational leaders of a decade ago saw the general outlines, the need of a closer association among elementary school, secondary school, and college. For the following selections from the *Proceedings* of the North Central Association of 1896 in proof of this point we are indebted to Professor G. N. Carman, of Lewis Institute. He submits them as bearing upon the problems of the "junior high school" and the "junior college," prominent today in the deliberations of the Association:

1896—PRESIDENT ANGELL

We must even look below the high schools, and keep ever in mind the essential unity of educational work. Under our forms of organization we have cut the process of education too much into disconnected sections, and placed high barriers of formal and formidable examinations between them. The pupil, instead of seeing an inviting path, clear and open before him, leading from the primary school to the university, has had his vision bounded by obstacles, towering higher and higher as he advanced.

1896—PRESIDENT JESSE

The first two years in college are really secondary in character. I always think of the high school and academy as covering the lower secondary period and the Freshman and Sophomore years at college as covering the upper secondary period. Until so much at least of academic training has been received, higher education, in my opinion, does not really begin.

In the secondary period, and in at least the Freshman and Sophomore years of the college, not only are the studies almost identical, but the character of the teaching is the same. The chief function of the instructor is to teach well what has been discovered and arranged, and thereby to form mind and character.

1896—PRESIDENT DRAPER

We cannot tell just where the high-school course is to end and the college course commence. We all believe that they are continuous and ought to be uninterrupted, but the differing circumstances of different communities will have much to do with fixing the point where the high-school course shall stop and the college course begin. That point will be advanced higher and still higher as communities grow in size and increase in knowledge, in culture, in means, and in all of the instrumentalities for educational development and progress. A high school in the city of Chicago, with several hundred pupils

and twenty or thirty teachers, must necessarily be a very different institution from a high school in the southern part of the state of Illinois, with fifty or seventy-five pupils and three or four teachers. It is not for us to commend unduly the one or do anything that will discourage the other. Perhaps both may be equally deserving of commendation. It is for this Association to do what it can to assist both.

No one is responsible for this condition of things. It is the inevitable result of natural conditions; and the college which meets the work of the more lowly high school, and does what it can to stimulate and encourage that institution, is none the less a college than the one whose fetich is advanced entrance requirements, but which commonly has a door somewhere through which anyone can get into some department of the institution.

1896—PROFESSOR HINSDALE

The first practical suggestion of this character found in the University documents is contained in the report of Acting-President Frieze for the year 1869–70. Dr. Frieze argued that if a genuine university was ever to be built in Ann Arbor, or elsewhere in America, it must be founded on a much higher scholarship in the preparatory schools; that these schools must be made real gymnasia, doing a large part of the work then done by colleges, before a university could be possible; and that until this was done, thus setting the higher institutions free for higher work, the best talent of the country seeking the best education would be compelled to find it in a foreign land. Dr. Frieze saw the gymnasia of the future in the high schools of the state.

1897—PRINCIPAL FRENCH

The growing carelessness with which the larger colleges are coming to regard their lower classes would be a great calamity were it not possible to regard it as the precursor of a revolution which will simplify our present complicated system and crystallize it into new and permanent forms. It is unquestionably true that the universities are more and more concentrating their energies in their postgraduate and professional schools, and are coming to regard their undergraduate work as academic or preparatory. It is to be hoped that this is but the beginning of a process by which they will abandon undergraduate work entirely and devote themselves exclusively to the field which is properly theirs. Their undergraduate work must then be shortened and turned over to the preparatory schools. If this is to be the outcome, we may deplore the present evil results of the adoption of such a policy, but the final product must be hailed with rejoicing.

The Wisconsin Law for Practice Teaching

The Wisconsin legislature of 1913 passed a law providing that after July 1, 1915, no person who shall not have taught in a public school

for at least one year will be granted a county teachers' certificate unless in addition to passing an examination such person shall have completed the course of study provided for the common schools of Wisconsin or one equivalent thereto, or the course of study provided for a graded system of at least eight grades, or one equivalent thereto, and who shall not have had at least two additional years of instruction in training, one of which shall have been devoted to professional studies preparatory to the work of teaching; provided that graduates of four-year high schools not maintaining a training course for teachers need take only one year of additional work.

Other features of the law include the experiment of establishing in one or more high schools located in the same county, with the approval of the state superintendent, courses for the training of teachers. The law further states that such training departments may be established only in those high schools where the faculty numbers at least four, exclusive of the person taking charge of the work in the training department. The course in the training of teachers must be maintained for nine months, and the salary of the teacher in charge is to be paid by the state.

When it is remembered that Wisconsin already has eight normal schools, with one more being built, candid judgment must admit that there seems to be little need for any such provision as this. Although the law provides that only experienced teachers are to be placed in charge of the training courses, the difficulty of finding expert instructors for the normal schools is already great enough. Exactly where the experienced teachers who are to conduct these courses will be found is an open question. The normal schools might fairly interpret this provision as indicating either a lack of confidence in their ability to train teachers, or an equal lack of ability to attract to the normal schools a sufficient number of students to officer the public schools.

Supervised Observation in the University of Wisconsin

Another experiment in practice teaching combined with critical observation of classroom situations has been undertaken by the department of education of the University of Wisconsin in connection with the University High School. The idea behind this high school is to avoid as much as possible any interference with the work of the high-school classes upon which the cadet teachers practice, and yet give the apprentice teacher a chance to show his skill. The method of accomplishing

these much-to-be-desired results may be illustrated as follows: Students in the university who desire to teach mathematics, let us say, become regular members of the high-school class in algebra. They sit with the high-school pupils, are held rigidly responsible for the subject-matter of the course, are called upon by the class instructor to recite and to participate fully in all the activities of the class.

In addition, these students are frequently asked by the instructor to assume the rôle of teachers—it may be to demonstrate a problem, to correct errors in blackboard work, or to conduct a class discussion. Moreover, these apprentice teachers are required to keep a record of the concrete classroom situations as they arise. Upon these situations, as solved or unsolved by the instructor in charge, they make critical comments as to what ought to have been done or ought not to have been done to meet the situations. These records are carefully examined by the principal of the high school and by the instructor in mathematics, and are used as the basis of the frequent and regular personal consultations by these officers with the apprentice teachers. The records are filed in the principal's office, where they may be examined by superintendents who come to the university in search of promising teachers.

The feature which is especially commendable in this plan is the excellent basis for critical observation. A visit for one day, a visit for a number of days, for that matter, does not give even the trained observer sufficient data upon which to judge the merit of either class or instructor; but several months of daily observation, backed by participation in the activities of the class, plus incidental work as a teacher, give even the most inexperienced college student a real opportunity for securing a practical working knowledge of how to solve teaching problems.

BOOK REVIEWS

Principles of Secondary Education. By PAUL MONROE. New York: Macmillan, 1914. Pp. 790.

This book, like a number of others which have recently appeared, aims to stimulate a broader interest on the part of secondary-school teachers and principals in the problems of high-school organization. Professor Monroe has induced a number of the special writers who contributed to his *Cyclopedia of Education* to discuss more fully once more the topics which they treated in the larger work.

The book opens with several historical chapters by the editor. These are followed by chapters on foreign school systems and the organization of the high school in the United States. There is a general chapter on the psychology and hygiene of adolescence. This is followed by a series of chapters on the subjects of instruction in the high school. A final division of the book deals with the reorganization of secondary education.

Professor Monroe has succeeded in giving the book a unity which is uncommon where a number of writers discuss independently topics so various as those which appear in these chapters. Yet one may very properly raise the question whether a series of specialists, each reviewing his own subject, can give the most illuminating view of the present state of education. Naturally the teachers of the various subjects tend to emphasize the importance of their own specialty. Furthermore, since they are the authorities in these particular subjects, it follows of necessity that they will be relatively conservative in their statements. They have contributed largely to the organization of the courses as they now stand and tend to defend the present practices, advocating only such enlargement as they regard as necessary in order to give the subjects proper recognition.

Commissioner Snedden's chapters on the reorganization of secondary education at the end of the book makes it perfectly clear that there will have to be some radical changes in the course of study before the secondary school serves the social and industrial functions which it ought to serve in modern American society. Perhaps the administrative officer who, like Mr. Snedden, sees the difficulties of secondary education would be better qualified to discuss the particular subjects and their place in the curriculum than specialists who are interested in the subjects themselves.

Several of the chapters in the book deserve special comment. The historical sketch which Professor Monroe contributed to the book gives in compact form a view of the development of American high schools which it is

important for every teacher in these institutions to read. There is a somewhat undue emphasis in the early pages on Greek and Roman education.

Professor Whipple's chapter on adolescence summarizes the material which has been discussed by various writers since the time of Hall in such a way as to make clear the physiological and psychological characteristics of this period.

Among the chapters on special subjects is one on industrial education which will undoubtedly command attention because of the significance of this type of work at the secondary level. This chapter was written by Mr. Richards, director of the Cooper Union. There is also a chapter on art in education by Professor Dewey.

The book will undoubtedly be used as a textbook in institutions which are preparing secondary-school teachers, especially in state universities where the problem of training such teachers has come to be one of the important functions of the institution.

C. H. J.

A Study of Foods. By RUTH A. WARDALL and EDNA N. WHITE. Boston: Ginn & Co., 1914. Pp. 174. $0.70.

This is a very concise little book, quite elementary in character but presenting accurate information. The treatment is of a conventional type, the most distinguishing characteristic being a greater emphasis on problems involving the cost of food materials.

As is usual with most books on food, Miss Wardall and Miss White have combined a laboratory manual and textbook material. In attempting to cover the entire problem of food and its preparation in 115 pages it is quite evident that much supplementary work must be given by the teacher in order adequately to consider the problems presented. While the supplementary reading suggested would supply most of this material, the books in many cases are far too advanced for students using so simple a text.

In a secondary school where no other science work is given, the book offers too little explanation of the general science problems involved in the preparation, preservation, and sanitation of foods. For a school offering science work it is too elementary in treatment.

While the laboratory exercises suggested under each subject are quite comprehensive in some cases, they frankly ignore general principles in others. For example, in the chapter on fruits and vegetables no general laws for cooking are developed, and the principles of jelly-making can be found only through supplementary reading.

It is to be regretted that the space given to food requirements and selection was not doubled at least, as an adequate presentation of this valuable phase of the food problem is one of the needs of high-school texts.

AGNES K. HANNA

UNIVERSITY OF CHICAGO

Manual of Play. By WILLIAM BYRON FORBUSH, President of the American Institute of Child Life. Philadelphia: George W. Jacobs & Co., 1914. Illustrated. $1.00.

Numerous books have been published dealing with games and special pastimes but the first serious attempt to provide a handbook covering the free play of children has been made by Dr. William Byron Forbush, Ph.D., author of *The Boy Problem.* The book is a veritable treasure house of play ideas which have been collected by Dr. Forbush through much correspondence with parents and teachers, and experience with the children themselves. We are told that Dr. Forbush has worked out most of his suggested plans in his own home and in his social work with boys and girls. The book will be invaluable to parents and those who have to provide for the free play of children in all its forms. The *Manual* begins with some practical ideas as to fitting up the playroom, the home yard, and the gymnasium. The actual playthings of children are discussed at some length. A schedule of plays which are most interesting to children at different ages is given, together with the laws and characteristics of growth, the correlation being made clear between what children desire to play and what is best for them to play at certain ages. As the Introduction says: "It tells parents how to play with their children, it shows parents how to help their children to play by themselves. There is a word about neighborhood and community play. While naming largely home-made playthings, it gives a carefully graded and annotated list of the best toys and occupations with their makers and approximate prices." There are full descriptions of plays which develop the sense of touch, the sense of hearing, the "muscle sense," and the sense of direction and distances. The discussions in every instance are thoroughly scientific, whether from the standpoint of psychology, physical education, or principles of education in general, and make an appeal to the professional reader. There are infinite suggestions on play with dolls, the arrangement of dolls for stories, plays of mimic life, plays of impersonation, laughter plays, serial plays, etc. The author has undoubtedly succeeded through this *Manual* in helping to lead to a revival of the play spirit in the hearts of older people and to a richer possibility of home, school, and community life.

LILLIAN H. BRUCE

CHICAGO NORMAL COLLEGE

Memorabilia Mathematica or The Philomath's Quotation Book. By ROBERT EDOUARD MORITZ, PH.D., PH.N.D., Professor of Mathematics in the University of Washington. New York: Macmillan, 1914. Royal 8vo, pp. vii+410. $3.00.

This interesting volume is made up of more than two thousand quotations relating to various phases of mathematics, conveniently arranged in chapters representing different aspects of the subject. Introductory chapters on

"Definitions and Objects" and on "The Nature of Mathematics" make clear the divergence of opinion among scholars as to what the word "mathematics" really connotes. The lay reader will probably find the chapters on "The Mathematician," on "Persons and Anecdotes," on "Mathematics as a Fine Art," and on "Mathematics as a Language" of greatest interest. Chapters are devoted to each of the larger divisions of mathematics, arithmetic, algebra, geometry, and the calculus, and the book closes with a chapter devoted to "Paradoxes and Curiosities" for which DeMorgans' inimitable *Budget of Paradoxes* is freely drawn upon.

Quotations from the writings of Euclid are of course out of the question, but opinions concerning the great Greek geometer are given in abundance. Plato, Seneca, and Plutarch are represented, and after reading the quotation from Weierstrass affirming that "the mathematician who is not somewhat of a poet will never be a perfect mathematician," we are not surprised to find quotations from Shakspeare, Goethe, Wordsworth, and Schiller.

On the whole, good judgment has been exercised in the selection of material, though it may be questioned whether the mere phrase-maker has not received too much attention and the creative scholar too little. For example, barely five quotations are taken from the works of the late Henri Poincaré, who was not only one of the "major prophets" of his generation, but also the author of a series of volumes singularly rich in quotable material relating to the wider aspects of science.

While great pains have been taken to indicate sources, for some of the translations the reference is to the medium of publication for the translation with no mention of the original source. This omission is scarcely fair to the author of a paper like Hilbert's "Mathematical Problems" which was originally delivered before the International Congress of Mathematicians at Paris in 1900, but is credited to the *Bulletin of the American Mathematical Society* in which Mrs. Newson's translation appeared in 1902.

Quotation No. 124 is erroneously attributed to Charles Wesley Young instead of to John Wesley Young.

ERNEST B. SKINNER

UNIVERSITY OF WISCONSIN

The General Education Board. New York: Published by the Board, 1915. Pp. 240.

The General Education Board has for twelve years been exercising a great influence in American higher education. In the first place, it has contributed directly to the maintenance of a number of colleges and universities. All of these contributions have been made in such a way as to stimulate the accumulation of additional funds. The Board points, therefore, with justifiable pride to the fact that it has secured for colleges and universities funds totaling millions of dollars.

Furthermore, the Board has exercised a very large influence in the organization of secondary schools in the southern states. Each of the states has been encouraged to appoint one or more officers whose salaries have been supplied by the General Education Board. These men have inspected the secondary schools and have stimulated their organization. In some cases the independence of these officers from local influences has been of the highest importance. They have had the boldness to expose conditions which were unfortunate and to criticize institutions which a local officer would have found it difficult to describe with any degree of freedom.

Beyond these two lines of work which have been described, the General Education Board has done much for the life of the community as a whole in that it has stimulated activities which are entirely outside of the ordinary school. It has developed, especially in the South, experimental farming and boys' and girls' clubs for raising corn and canning tomatoes. It has in this way reached the very roots of the social difficulty in the South where a highly developed, intellectual training is not so important as an improvement of economic conditions.

Most of these agricultural experiments were carried on under the form of activities of the agricultural development of the United States government. Since the federal government took over this work, the General Education Board has extended its activities into some of the northern rural states, and is at the present time engaged in encouraging rural education, especially in Maine and New Hampshire, where it has a number of demonstration centers.

As one passes in review the various productive activities of the General Education Board, he finds it difficult to overlook some of the other contributions which the Board might have made during the period. In the first place, the Board now presents its first report to the public. This contains nothing but the barest outlines of its policy or its financial transactions. The policy of a board of this sort is so significant to the country at large and its financial transactions are so much a matter of public interest that it seems desirable for the Board to keep in constant contact with the country through a detailed and complete statement of its doings. The unrest which is felt with regard to the influence of these great foundations can in no way be more completely allayed than by reports that shall give in the most explicit fashion an account of all of the doings of these great sources of influence.

One reads between the lines in this report a clear conviction that education needs some form of reorganization, and that emphasis, certainly in many districts of the United States should be laid upon an intelligent organization of industrial education. There can be nothing but agreement with this general doctrine. On the other hand, the working out in detail of the principles which shall realize this demand and make for improved industrial education is one of the largest problems which confronts American educators, and it is desirable that the views of any influential organization should be submitted explicitly and in detail to the broadest criticism.

The report in hand has one great virtue. It is written in a form which will appeal to the ordinary reader. The common form of reports is such as to repel everyone except the technical student. On the other hand, the technical student of reports will feel that the present report is not sufficiently explicit or detailed to make it possible for him to write the history of the General Education Board as a part of the American educational system. He will feel, perhaps more than do the officers of the Board, the importance of supplementing the present statement with much material which is not now easily accessible.

C. H. J.

The Discipline of the School. By FRANCES M. MOREHOUSE, of the Illinois State Normal University. With an Introduction by LOTUS D. COFFMAN, Professor of Education in the University of Illinois. Boston, New York, Chicago: D. C. Heath & Co., 1914. Cloth. Pp. 360. $1.25.

In an older day, writers on school discipline based their treatment on the doctrine that the child is by nature inclined toward evil, and that he can be got to follow paths of rectitude only by constant urging and much coercion. But during the last fifty years or so, particularly in our country, there has been constant relaxation of this rigorous attitude until now it is almost entirely abandoned and in its place has come the view that the child's impulses are wholesome and useful, and he ought to be given freedom to do about as he chooses. Most people today seem to have a very tender feeling for childhood. They cannot bear to see a child suppressed in any of his tendencies. The Montessori philosophy has captivated our people largely because it gives prominence to the plan of complete freedom and spontaneity for childhood. Coercion appears to be abhorrent to most of those among us who are expressing themselves regarding the training of the young.

The present volume is an exception to the tendencies of the hour in that it inclines rather toward the rigorous than the sentimental attitude in the discipline of pupils. While the author does not at any point say whether or not she believes an individual is born in original sin, yet it is probably a safe inference from what she does say that she thinks he brings with him into this world certain impulses which have been bequeathed to him by his ancestors, and which strive vigorously for expression under present-day social conditions. But the social situations existing when these impulses were established were so different from the social situations today, that if these impulses be freely expressed they will create ethical and moral havoc. Therefore effective discipline will require a certain amount of coercion, both in a negative way in compelling a pupil to restrain some of his impulses, and in a positive way in urging him to perform activities which are made desirable because of his relations to his fellows. At the same time, this book gives a dominant place in

the discipline of the school to those methods and devices which seek to beguile the pupil into good conduct by making good conduct attractive and worth while as he sees the matter.

The author nowhere in the book mentions John Locke, but her fundamental philosophy of discipline seems very much like that of the older writer, which is to say that her philosophy is sane and sound, and founded upon a natural and, we might say, scientific, rather than a sentimental view of child nature and the requirements for effective social training.

The book might well be considered in two parts, the first dealing with the general conception of the school as an institution for helping the child to adapt himself to social situations and the general principles underlying school government, and the second part dealing with the more important shortcomings of pupils, and the way in which these can be dealt with most effectively. The second part grows directly out of the first, and is founded upon it. One gets the impression that the author has seen clear through her problems, and has organized her complex and varied materials so that they can be considered under a few general headings. She takes a comprehensive view of the whole field. The origin and need of discipline is treated; the methods that have been employed are pointed out; and the changing conditions in American life which affect discipline in the school are described. The author takes the developmental point of view as Locke did, and consequently her methods of discipline change as the child becomes more mature. In the beginning he must form habits of good order under the direction largely of absolute authority, but as he enters the reflective period he may be appealed to on the side of reason. Throughout the discussion one feels that the author believes in discipline, the aim of which is to cause the individual to control those impulses which if expressed will make profitable work and training in the school impossible.

The author regards all methods of school government under five types or modes: (1) absolute authority, (2) appeal to personal interest, (3) personal influence, (4) wholesome repletion, (5) appeal to social consciousness. Each of these methods is useful in its proper place. Some teachers today would under no circumstances make use of either of the first two methods; but our author is probably on safer ground than any person who would attempt to discipline an American school without ever using absolute authority or appeal to personal interest. If the author errs at all here, it is in that she does not give these modes of control a prominent enough place. One who views this matter from a biological standpoint sees that the use of absolute authority and appeal to personal interest have played the dominant rôle in the government of the young from the beginning of the race to the present hour, and they probably ought to play a part in the life of the schoolroom of today. Even those who protest against it in theory make generous use of it in practice. Miss Morehouse, in the last half of her book, in which she deals with concrete cases of discipline, makes quite frequent use of the principle of appeal to personal interest, and properly so.

The last three modes of government are quite in favor today, though the fourth, wholesome repletion, is brought out more strongly by our author than by most persons who write on the subject of school government.

The chapters dealing with "The Disciplinary Process," and "The Spirit of the School" lead into the very heart of the problems of school government. The remaining chapters, on "Offenses Common in American Schools," "Punishment," "Disciplinary Devices," and "The Supervision of Discipline," are exceedingly concrete and practical, in the sense that they present actual situations requiring discipline, and indicate ways and means of solving the problems which arise.

Enough has been said probably to show that the reviewer thinks this is a very good and useful book. It is written in the scientific spirit, which means that it is founded upon the best present-day thought regarding human nature, and especially child nature, and it is temperate and modest throughout. It shows fine balance between what might be called the intellectual and the emotional attitudes toward childhood and questions of discipline. Some readers may think there is not quite enough of sentiment in the book, but most readers will probably feel that this is one element of its strength. There is sentiment in the book, but it is kept in abeyance, as it should be. The author is sensitive to child nature, but not sentimental about it, which again is undoubtedly the proper attitude to take. It may be that in American life children are not being governed quite enough, with the result that they are in conflict with established authority a considerable part of the time, thus bringing strain and stress upon themselves and causing irritation to those with whom they come in contact. In the schoolroom there is a better spirit than there was in an older day and there are also less restriction, less coercion, and less punishment because teachers know better than they once knew how to capture the attention of pupils and utilize their energies in constructive and legitimate ways. This is all very good; but there is evidence that in some school systems there is not a sufficient exercise of authority to hold in check the riotous impulses of immaturity. Even in the best schoolrooms with the finest teaching there will probably always be a necessity for a minimum amount of government, and this will be better for pupils than if they be let to go without control. He is not the happiest individual who knows no let or hindrance to his impulses. The typical child especially seems to need the assistance of those in authority to help him hold his lawless prompting in check, and this appears to be one conception in view of which the practical suggestions in this book are made.

The style is suited to the tone and temper of the book. There is about it a certain dignity without stiffness or formality. A lover of good English would be pleased with the purity of terms and grace of constructions. Concrete illustrations are freely utilized to give point and definiteness to principles. There is a summary at the close of each chapter; and at the end of the book there are a number of problems and exercises suggested for each topic treated.

There are also a classified bibliography and an index; so one may commend the book, not only for its content and its style, but also for its serviceableness as a text.

M. V. O'SHEA

UNIVERSITY OF WISCONSIN

Advanced American History. By S. E. FORMAN. New York: Century Co., 1914. Pp. xiv+624.

This text has many excellences to commend it to high-school teachers. Its style is simple, but forceful. Sketch maps appear in profusion, while the colored maps are both unusually numerous and satisfactory. The organization is such as to render topical assignments easy. Inexperienced teachers will find in the reference lists at the close of the chapters a welcome relief from the bewildering profusion of the ordinary chapter bibliographies. The selections listed are few, specific as to pages, confined to a few books such as the ordinary school library may afford, and of a length and character, for the most part, suited to the high-school student's opportunities and interests. Correlation between American history and government is rendered easy for both teacher and pupil by a marginal numbering of the clauses of the Constitution in the Appendix and by the use of corresponding numerical references in the body of the text where correlation is advisable. Above all, the work emphasizes in greater degree than any other high-school text those phases of American history for the consideration of which most insistent demands are being made on all sides, the westward movement of the American people and their social history. No less than eight of the forty-five chapters, or nearly one-fifth, are given over wholly to surveys of social and industrial progress, while many others contain sections dealing specifically with these phases. Best of all, Mr. Forman has shown ability in most cases to do more than marshal dead tabulations of statistics. He has known how to interpret and express in clear, striking, significant phrases the important indications of progress. The social chapters are indispensable, and should assure the volume a place upon the reference shelves of school libraries where it is not used as a text.

But the other pan of the balance is not empty. The illustrations of the volume are surprisingly small in size, though numerous and well chosen. Occasional chapters dealing with important portions of our history are meager and unsatisfactory; e.g., the chapter entitled "The Quarrel," dealing with the causes of the Revolution. Most serious of all there is a marked tendency throughout, in dealing with political events, to write *about* them, rather than to state the facts. The powers of significant interpretation so advantageously used in dealing with social and industrial history here become a hindrance. Some work of this type must be left to the student for the development of his own powers, and the political field, where the facts are more patent, offers the best opportunity. A text which makes the interpretation, but hides the facts upon which they are based, may offer an easier road, but surely not the more profitable one.

V. L. MINOR

Shakespeare's Principal Plays. Edited by TUCKER BROOKE, JOHN CUNLIFF, and HENRY MCCRACKEN. New York: The Century Co., 1914. Pp. 957. $3.00.

Though combining new material in new form and though free from overburdening notes, this book does not seem to justify its publication. For full college courses and for private use it is incomplete; for high schools it is superfluous. Single-volume editions which are complete can be had at the same cost, while for high-school use the numerous cheap editions of single plays will probably continue to suffice. The "happy medium" attempted has not been realized.

R. B. W.

Selected Essays. Edited by CLAUDE M. FUESS. (Riverside Literature Series.) Cambridge: Houghton Mifflin Co., 1914. Pp. xiv+219. $0.40.

A Book of English Essays. Edited by C. T. WINCHESTER. New York: Henry Holt & Co., 1914. Pp. xiv+405.

Selected Literary Essays from James Russell Lowell. Edited by WILL DAVID HOWE and NORMAN FOERSTER. (Riverside Literature Series.) Cambridge: Houghton, Mifflin Co., 1914. Pp. xviii+312. $0.60.

These three books of essays for school use represent three distinct types of anthologies as well as three methods of annotating a school text. Mr. Fuess's collection proposes to meet college-entrance requirements by providing the student with a representative handbook containing various types of essays; he has the courage and good sense to include selections from contemporary essayists, such as Agnes Repplier and Arthur C. Benson. Mr. Winchester evidently intends to set forth in brief space by example the historical development of the essay. Finally the Lowell selections are of course designed for the intensive study of one essayist; as such the selection is particularly fortunate, since the student gains not only an acquaintance with Lowell, but also with Dryden, Chaucer, and other literary men.

It is to be regretted that the editors have not seen fit to annotate the Lowell volume, for of all American authors Lowell stands most in need of explanatory notes. The Winchester volume goes to the other extreme and explains everything; surely it is superfluous to note the sources of phrases like "the tents of Shem" or "in Rama," and words like "tilbury," "gazette," and "thug" might better point the way to a dictionary than to the laziness induced by notes. The book contains sets of suggestive questions and admirable biographies of the essayists. All in all, however, Fuess's restraint in the matter of annotations approaches nearer to the golden mean of note-making.

Equipped with any of these texts a high-school class should arrive at a pretty fair idea of the essay as a literary form.

H. M. J.

The Principles of Greek Art. By PROFESSOR PERCY GARDNER, University of Oxford. New York: Macmillan Co., 1914. Pp. xvii +352. $2.25.

Just as the poetry and prose of the Greeks is expressed in a particular language, the words and the grammar of which must be studied by those who would understand the literature, so works of Greek painting and sculpture also are composed in what may be called a particular artistic language. The words of that language are the strokes of the brush and the chisel; but these are put together in order to embody Greek ideals in ways which are distinctive and not like those adopted by any other people; certainly unlike those of modern art. The object of the present work is to set forth, as simply and directly as possible, what these ways are; to define, in fact, the principles of Greek art, and so render more intelligible the works of painting and sculpture which have come down to us from Hellenic antiquity.

Although the problem before us is one which can be solved by a close and long-continued examination of the monuments of Greek art, yet it is at bottom psychological. We have to determine the laws according to which the mind, the taste, the hand, of the artist worked. We are speaking of a generalized or ideal process. It will not, of course, be supposed that a sculptor or painter, before he set about his work, consciously or deliberately thought out the lines on which he should proceed. He went by the traditions of the craft, the customs of a school. But his unconscious process can be brought out in regular and methodical form; and this is what I propose to do.

With these words Professor Gardner introduces a volume of absorbing interest to those who concern themselves with either the history or the theory of art. The book is more than a revision of the author's *Grammar of Greek Art*, which appeared in 1905; it presents a complete working-over of the earlier volume with extensive additions, including two new chapters.

The difficulty of the task which Mr. Gardner set before himself is obvious. Yet in the face of the decline of the study of Greek in schools and colleges one may well doubt whether there ever was a time when Greek art made a wider appeal than it does today, or when there was greater need of a work that should set forth clearly the means by which it expressed itself. All about us, in every conceivable relation, we see decorative designs and architectural forms which trace their origin to the ancient Greeks; it is no exaggeration to say that the study of the art of no other people will yield so much to the understanding and appreciation of the aesthetic elements in our modern culture.

Two characteristics of the volume are noteworthy: the breadth of treatment and the pertinence of the illustrations, of which there are more than a hundred; these are interpreted by full descriptions in the text, and hackneyed subjects are so far as possible avoided. Freshness and vigor are characteristic also of the subject-matter, which abounds in suggestive analogies outside the Greek field; thus we read (p. 94):

Among ourselves, the fashionable women who resort to the fortune-tellers of Regent Street certainly cannot look down upon those who in Greece resorted to the

oracles of Zeus and Apollo in honest search for the better line of conduct. The individualists who feel no sense of duty to the state and society would be infinitely improved if they could find in the beauty of a statue an expression of the divinity of the common life of the city or state. . . . . The influence of many schools of modern art tells not merely towards artistic chaos but towards ethical degradation.

Consistently with the point of view revealed in his previous writings the author treats Greek art, not as an isolated development, but in immediate relation with that kindred manifestation of the Hellenic genius, the Greek literature. Quotations from the Greek are, however, given in translation, and technical details are not obtruded. The author's handling is moreover less subjective than might have been anticipated in the case of a theme which tempts to generalization. There are few points in regard to which scholars will disagree with him.

The pages of the *School Review* can hardly provide space for detailed criticism, or for more than a suggestion of the varied contents of the volume. After an introductory chapter we find a brief summary of the observations of the Greek and Roman writers upon the fine arts, particularly sculpture and painting; and two chapters deal with the basal conceptions of Greek architecture as expressed in the temple, the house, and the tomb. There follow illuminating discussions of the formation of artistic types, the types of the gods, and the law of frontality in Greek art. Four chapters are devoted to sculpture, including a special treatment of the Greek dress shown in sculpture; four to Greek painting, chiefly, of course, vase-painting; three to literature and painting, including an extended analysis of the judgment of Paris as treated in literature and in art; and two to art in relation to history, with a special treatment of coins. The last of the twenty-one chapters contains a thoughtful and suggestive essay upon naturalism and idealism in Greek art.

The departments of art and of the classics in the universities are frequently asked to recommend books on art for purchase by public and school libraries. Surely no list of such works now will fail to contain the title of this book by Professor Gardner, who in it sums up the conclusions reached as a result of many years of fruitful study. Those who work through the volume will, I think, find themselves in sympathy with the author's closing remarks, which may well be quoted here:

The Greeks, by the universal confession of artists and students of art, bore a message, not only to their own time and country, but to all men in all ages. Their art was classical, that is, conformed to what is permanent and above criticism in human life. It is for this reason that it must hold an important place in education, the main object of which is, or should be, to enable the learner to discern between good and evil. Thus all ages must owe a debt to Greece for the simple beauty, the sanity, the healthfulness of the ideal element which she introduced into art, making it for the first time in history a true exponent of the human spirit.

F. W. KELSEY

ANN ARBOR, MICH.

BOOK-NOTES

SHERMAN, STUART P. (editor). *A Book of Short Stories.* New York: Henry Holt & Co. 1914. Pp. xxxiv+353.

This book contains a thought-provoking discussion of the short story, the usual examples plus O. Henry and study questions. Intended for classes studying the short story.

LOMER, GERHARD R., and ASHMUN, MARGARET. *The Study and Practice of Writing English.* Boston: Houghton Mifflin Co., 1914. Pp. v+342. $1.10.

In addition to the usual grammatical information, this book contains brief sections on "Making a Bibliograph," "How to Listen to a Drama," "Translation," and "Letter-writing" plus the usual contents of a manual of composition. Each section is followed by a bibliography. The method shows the influence of Woolly. An excellent manual.

WILBUR, MARY ARONETTA. *Every-Day Business for Women.* School edition, with an Introduction by OSCAR C. GALLAGHER. Boston: Houghton Mifflin Co., 1914. Pp. xiii+276. $0.80.

This is an attempt to present business principles in simplified spelling. In the best sense it is a vocational book, since its principles are general, but valid for any occupation. Some attempt at a historical treatment is made. As the author naïvely states, "frequent touches of humor enliven the pages."

HITCHCOCK, ALFRED M. *New Practice-Book in English Composition.* New York: Henry Holt & Co., 1914. Pp. xi+447.

A radical revision of the familiar practice-book. The chief changes are an expansion of Part I of the older edition (exercises in simple composition); additional material in the treatment of grammar, and a rearrangement of the exercises. The chapter of versification is retained, and an appendix added on proof-correcting. Like Mark Twain's dog, "for people that like this kind of a book, this is the kind of a book people like."

WILSON, A. E. (editor). *Armin's Der Tolle Invalide auf dem Fort Ratonneau.* With Introduction, Exercises, and Vocabulary. Cambridge: The University Press, 1914. Pp. vii+63.

A romantic tale for classes using the direct method.

FULTON, MAURICE GARLAND. *College Life, Its Conditions and Problems.* New York: MacMillan, 1914. Pp. xxii+524.

This is a collection of "essays for use in college writing courses," the essays dealing with such topics as the purpose of the college, the curriculum, choice of courses, athletics, college government, fraternities, dormitory life, etc. An embarrassment of material.

HATFIELD, JAMES TAFT (editor). *Shorter German Poems Suitable for Memorizing in Secondary Schools.* Boston: D. C. Heath & Co., 1915. Pp. vii+110. $0.35.

Sixty-eight selections graded as to difficulty. Musical settings are given for eleven. Notes and vocabulary. Goethe, Uhland, Heine, and Schiller figure prominently.

A Handbook of English for Junior and Intermediate Classes. Cambridge: The University Press, 1914. Pp. viii+107. 1*s.* 6*d.*

An English handbook. It looks rather dry.

PALMER, GEORGE HERBERT. *Trades and Professions.* (Riverside Educational Monographs.) Boston: Houghton Mifflin Co., 1914. Pp. xiii+36. $0.35.

A reprinting of an excellent address, with a no less admirable introduction. It answers the efficiency fanatic in education.

PAMPHLETS

Annual Report on Reforms and Progress in Chosen (Korea) (1912–13). Compiled by the Government-General of Chosen. Keijo (Seoul), December, 1914. Pp. xii+271. With maps and illustrations.

EVANS, HENRY R. *Library Instruction in Universities, Colleges and Normal Schools.* U.S. Bureau of Education, Bulletin, 1914, No. 34. Whole No. 608. Washington: Government Printing Office, 1914. Pp. 38+iv. $0.05.

GRANGER, MARSHALL A. *An Application of the Teachings of Christ to the Relation of the Employer to His Employees.* Bulletin of the University of Kansas, XV, No. 9. Lawrence, Kan.: Press of the Department of Journalism, University of Kansas, 1914. Pp. 28+ii.

A brief bibliography is added.

JOSSELYN, HOMER W. *Survey of Accredited High Schools and Professional Directory.* Bulletin of the University of Kansas, XV, No. 16. Topeka: Kansas State Printing Office, 1914. Pp. 252.

MONAHAN, A. C. *County-Unit Organization for the Administration of Rural Schools.* United States Bureau of Education, Bulletin No. 44. Whole No. 618. Washington: Government Printing Office, 1914. Pp. 56+iv. $0.10.

Over-Age and Progress in the Public Schools of Dayton, 1913–1914. Dayton: Bureau of Municipal Research, 1914. Pp. 20.

Report of the Commission on National Aid to Vocational Education. Vol. I. Washington: Government Printing Office, 1914. Pp. 207.

CURRENT EDUCATIONAL LITERATURE IN THE PERIODICALS[1]

IRENE WARREN
Librarian, School of Education, University of Chicago

Arnold, Felix. Obstructed breathing and memory. Psychol. Clinic 8:234–46. (Ja. '15.)

Baker, Franklin T. High-school reading: compulsory and voluntary. English J. 4:1–8. (Ja. '15.)

Bowden, Witt. Education for the control and enjoyment of wealth. Educa. R. 49:147–67. (Fe. '15.)

Canby, Henry Seidel. The undergraduate background. Harper 130:466–71. (Fe. '15.)

Childe, Elizabeth. Teaching concentration. Outl. 109:155–59. (20 Ja. '15.)

Claxton, P. P. The American rural school. School and Society 1:37–50. (9 Ja. '15.)

Coulter, John M. The mission of science and education. School Sci. and Math. 15:93–100. (Fe. '15.)

Cubberley, Ellwood P., and Elliott, Edward C. Rural-school administration. School and Society 1:154–61. (30 Ja. '15.)

Cushman, Lillian S. A test of efficiency for the industrial arts. Indust. Arts M. 3:49–51. (Fe. '15.)

Dabney, Charles W. The movement for the modern city university in Germany. School and Society 1:150–54. (30 Ja. '15.)

Dewey, John. The American Association of University Professors: Introductory address. Science 41:147–51. (29 Ja. '15.)

Eliot, Charles W. Educational evolution. School and Society 1:1–8. (2 Ja. '15.)

Fitz-Gerald, John D. Languages and the college-preparatory course. Educa. R. 49:168–90. (Fe. '15.)

Foster, Wilfred L. Improvement of dental hygiene in the high school, with relation to efficiency. Psychol. Clinic 8:230–33. (Ja. '15.)

Foster, William T. The state-wide campus. School and Society 1:13–16. (2 Ja. '15.)

[1] *Abbreviations.*—Cur. Opinion, Current Opinion; Educa., Education; Educa. R., Educational Review; El. School J., Elementary School Journal; English J., English Journal; Hist. Teachers M., History Teachers Magazine; Indust. Arts M., Industrial Arts Magazine; Outl., Outlook; Pop. Sci. Mo., Popular Science Monthly; Psychol. Clinic, Psychological Clinic; School Sci. and Math., School Science and Mathematics.

Gerrish, Carolyn M. Secondary school composition. Educa. R. 49:126–35. (Fe. '15.)

Gruenberg, Benjamin C. Thought in science and in science teaching. Pop. Sci. Mo. 86:164–73. (Fe. '15.)

Hall, G. Stanley. Teaching the war. School and Society 1:8–13. (2 Ja. '15.)

Harris, James H. An inquiry into the departmental system. El. School J. 15:323–30. (Fe. '15.)

Hinckley, Alice C. Six weeks with a supposedly hopeless case. Psychol. Clinic 8:213–29. (Ja. '15.)

Johnston, W. Dawson. The library and history study. Hist. Teachers M. 6:31–33. (Fe. '15.)

Johnston, W. Dawson. The library and the teaching of English. English J. 4:21–27. (Ja. '15.)

Lovejoy, Owen R. Education and industry debating over children. Survey 33:399–400. (9 Ja. '15.)

Manuel, Herschel T. The use of an objective scale for grading handwriting. El. School J. 15:259–78. (Ja. '15.)

Oberholtzer, E. E. Testing the efficiency in reading in the grades. El. School J. 15:313–22. (Fe. '15.)

(A) physiological discovery that explains the formation of bad habits. Cur. Opinion 58:101–2. (Fe. '15.)

Prosser, C. A. The Richmond survey of the National Society for the Promotion of Industrial Education. School and Society 1:161–64. (30 Ja. '15.)

Royce, Josiah. The Carnegie Foundation for the Advancement of Teaching and the case of Middlebury College. School and Society 1:145–50. (30 Ja. '15.)

Sachs, Julius. The secondary school teacher and the college. School and Society 1:50–53. (9 Ja. '15.)

Sears, J. B. The problem of the rural school. Pop. Sci. Mo. 86:174–79. (Fe. '15.)

Thorndike, Edward L. The disciplinary value of studies: a census of opinions. Educa. 35:278–86. (Ja. '15.)

Waldo, Karl Douglas. Tests in reading in Sycamore schools. El. School J. 15:251–68. (Ja. '15.)

Wilgus, James A. The teaching of history in the elementary school. Educa. R. 49:136–46. (Fe. '15.)

Woodbridge, Frederick J. E. The university and the public. Educa. R. 49:109–25. (Fe. '15.)